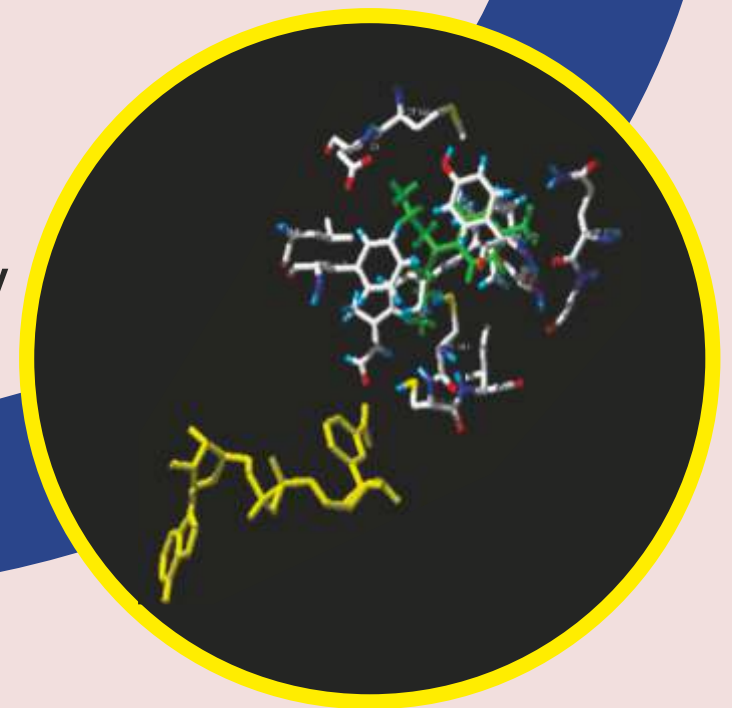




Proceedings of the
108th
**Indian
Science
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RTM Nagpur University
Nagpur



President
Dr. R. Kavyashree

**SECTION OF NEW BIOLOGY (INCLUDING BIOCHEMISTRY,
BIOPHYSICS & MOLECULAR BIOLOGY AND BIOTECHNOLOGY)**

**THE INDIAN SCIENCE CONGRESS ASSOCIATION
KOLKATA**

108th Indian Science Congress

3-7 January, 2023, Nagpur



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**PROCEEDINGS
OF THE
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NAGPUR, 2023**

PART II

**SECTION OF
NEW BIOLOGY (INCLUDING
BIOCHEMISTRY, BIOPHYSICS & MOLECULAR
BIOLOGY AND BIOTECHNOLOGY)**

President: Dr. R. Kavyashree

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108TH INDIAN SCIENCE CONGRESS

JANUARY 3-7, 2023
NAGPUR

I

PRESIDENTIAL ADDRESS

President: Dr. R. Kavyashree

PRESIDENTIAL ADDRESS

Biotechnology: Key to Revolution in Health Care

Kavyashree, R

Department of Biotechnology, The Oxford College of Science,
Bengaluru – 560 102, Karnataka, India
Email: hodbiotechoxford@gmail.com

ABSTRACT

Biotechnology is considered to be one of the greatest technological breakthroughs for this new millennium. Modern biotechnology has been focusing on human health care for decades related to development of vaccines, drugs, diagnosis of various diseases and treatment. Throughout history, disease has been a subject of fear and fascination in equal measure. However, each revolutionary discovery has brought us closer to understanding the complex mysteries of various diseases and medicine. As a result, treatments have been developed that has been saving millions of lives.

The healthcare industry is changing and evolving at an extremely fast pace right now. The healthcare sector is one of the largest and most complex among the industries. India's healthcare sector was worth about US\$280 billion in 2020 and it is estimated to reach up to US\$ 372 billion by 2023. The country's healthcare market has become the largest sectors in terms of revenue and employment.

This sector enjoys the benefit of strong medical research and development in collaboration with the higher education system and the technology industry. Throughout the 1800s and early 1900s, various vaccinations were created to combat some of the world's deadliest diseases, including smallpox, rabies, tuberculosis, and cholera. Over the course of 200 years, one of the deadliest diseases known to man – the smallpox – was wiped off the face of the earth. Since then, virtually all vaccines were developed based on the same principle until recently a new technology called mRNA vaccines came along and created some game-changing possibilities for the future of healthcare. Its high effectiveness, capacity for rapid development and potential for low production costs were evident during the Covid-19 pandemic and two separate mRNA vaccines were developed and approved for use in just a matter of months.

Alexander Fleming's penicillin, the world's first antibiotic, completely revolutionized the war against deadly bacteria. Since then, several antibiotics found their way to the shelves, saved many lives and contributed to the control of many infectious diseases. Unfortunately, over the years certain bacterium have become increasingly resistant to antibiotics, leading to a world-wide crisis that calls for the pharmaceutical industry to develop new anti-bacterial treatments as soon as possible. Terrible viruses such as small-pox, influenza and hepatitis have ravaged many human populations throughout history. The development of effective antivirals has been a significant breakthrough in treating and controlling the spread of deadly virus outbreaks such as HIV/AIDS, Ebola and Rabies.

The incredible potential of stem cells was discovered in the late 1970s and now, the attempts are being made to use stem cells to treat spinal cord injuries and a number of neurological conditions such as Alzheimer's, Parkinson's and strokes. In the 1970s, antibody therapies were developed and in 1991, researchers produced the first cancer vaccine, which was approved, by the US Food and Drug Administration in 2010. In the last decade, immuno-oncology has become one of the most revolutionary cancer therapies in existence. This recognized method is rapidly developing with many accelerated approvals by the USFDA and European Medicines Agency.

The Fourth Industrial Revolution is transforming both health care and medicine due to the lightning-speed advances in genomics, proteomics, genetic engineering, synthetic biology, systems biology, nanotechnology, data science, Artificial Intelligence, robotics and many more. It's clear that the pandemic has accelerated the digitization of the healthcare industry. Engineering genetics to make the body kill cancer cells, growing artificial organs for transplant, and pills that can 'talk' to you: these are all examples of how the Fourth Industrial Revolution is set to radically change the health care domain by "blurring the lines between the physical, digital, and biological". As long as humans are there on this planet, the health care sector will continue to grow.

Keywords: Healthcare, Vaccines, Antibiotics, High-throughput methods, Fourth Industrial Revolution

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II

ABSTRACTS OF PLATINUM JUBILEE/ AWARD LECTURES

PLATINUM JUBILEE LECTURE

Cancer and Stem Cells: An Unholy Alliance

Annapoorni Rangarajan

Department of Molecular Reproduction
Development and Genetics, Indian Institute of Science, Bengaluru
Email:anu@iisc.ac.in

ABSTRACT

An appreciation of the similarities between cancer cells and stem cells since the beginning of this century brought about a paradigm shift in our understanding of cancer initiation, progression, and treatment. It led to the proposal of the *stem cell theory of cancer* which predicts that cancer originates in the normal adult stem cells that are otherwise essential for the maintenance of our body. It further postulated the existence of **cancer stem cells (CSCs)**, a subpopulation of cancer cells with stem cell-like properties, as the primary cause of treatment failure and disease relapse. My laboratory has been studying the origin and biology of CSCs, with specific focus on developing more efficacious strategies for cancer treatment.

By genetic manipulation of *normal* breast stem cells, we converted them to breast cancer cells harbouring CSCs, thereby providing early evidence in support of the nascent theory of stem-cell origin of cancer. We and our collaborators succeeded in depleting these CSCs by designing novel monoclonal antibodies and nanoparticles. We developed in vitro 3-dimensional models to recapitulate in vivo breast cancer behavior. Recently, we have identified AMPK – a central metabolic sensor protein – as a key molecular *switch* that governs the *stemness* properties of cancer cells, aiding their spread to distal organs and chemoresistance. By identifying novel tumorigenic functions of AMPK which is otherwise known as a tumor-suppressor, we propose the idea of *contextual oncogene* – a new paradigm that challenges the existing cancer theories and treatment modalities.

Key words: Cancer stem cells, Breast cancer cells, contextual oncogene, Metabolic Sensor Protein

PROF SS KATIYAR ENDOWMENT LECTURE

**Blood Cells and Redox system: Key players in Regulating
Human Diseases**

Kesturu S Girish

Department of Studies and Research in Biochemistry
Tumkur University, B.H.Road, Tumkur, Karnataka, India
Email: ksgbaboo@gmail.com

ABSTRACT

Blood is the life-maintaining fluid that circulates throughout the body and carries gases, ions, proteins and nutrients. The cellular component of blood consists of three main classes, red blood cells (RBCs), white blood cells and platelets. RBCs transport oxygen to our body tissues, and the number of RBCs determines the amount of oxygen delivered to the tissues. WBCs help combat infections and parasites, while platelets aid in blood coagulation. These immune cells actively participate in several pathologies and life style disorders including infection, diabetes mellitus, hemolytic disorders and snake venom induced toxicities. In these pathophysiological conditions, blood cells may undergo death/dysfunction by different means as well as activation leading to coordinated thromboinflammation and coagulation. The malfunction of the finely tuned redox systems in particular glutathione cycle that maintain oxidative balance lead to the death/dysfunctional/activation of the blood cells. In addition, altered redox systems in blood cells is observed in various clinical conditions that are associated with chronic inflammation, tissue injury and impaired immune functions such as autoimmunity, Alzheimer's and Parkinson's diseases, diabetes, and microbial -infections. These facts thus underscore the need of redox modulators and/or molecules, which can tightly regulate the balance between ROS production and glutathione cycle for an efficient restoration of blood cells. The talk will address the participation of blood cells and their modulation by redox modulators/molecules in clinically important pathologies including snakebite induced toxicity, diabetes and microbial infections.

Key words: Red Blood Cells, Snake Venom, Immune Cells, Redox Modulators, Microbial Infections

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III

ABSTRACTS OF
SYMPOSIUM/ INVITED LECTURES

SYMPOSIUM-1A

Current Trends in Health Care-
Oncobiology

INVITED LECTURE

Targeting galectin-3 to overcome drug resistance in metastatic prostate cancer therapy

Hafiz Ahmed

GlycoMantra Inc.,

Biotechnology Center at the University of Maryland, Baltimore,
MD, USA, ; University of Maryland Baltimore County,
Baltimore, MD, USA; University of Maryland School of Medicine,
Baltimore, MD, USA

Email: hfzahmed@gmail.com

ABSTRACT

Galectin-3 (Gal3), a beta-galactoside-binding lectin, is involved in the progression of many cancers. We have shown that in prostate cancer, Gal3 promotes tumor angiogenesis, tumor-endothelial cell adhesion, and metastasis; and also evades immune surveillance by killing infiltrating T cells. Gal3 also augments cancer stem cells in prostate cancer, contributing to drug resistance. Our scientific premise is that we have developed a very high affinity (picomolar) Gal3 antagonist, GM101 that outcompetes Gal3's interactions with endogenous ligands. GM101 blocks angiogenesis, tumor-endothelial cell interactions, apoptosis of activated T-cells, and lung seeding of prostate cancer cells. In a transgenic mouse (*Hoxb13/MYC/Pten^{lox/lox}*) model, GM101 blocks metastasis, promotes anti-tumor immune response, and increases survival. As there are no drugs available for the metastatic castration resistant prostate cancer (mCRPC) patients that developed resistance with Zytiga (Abiraterone) and/or Xtandi (Enzalutamide), we investigated if GM101 can be used as a therapeutic for these patients. In humanized NSG mice xenografted with a human mCRPC patient-derived tumor (PDX), GM101 suppresses abiraterone-resistant tumor growth and increases animal survival. Our results suggest that GM101, both as a stand-alone product or in combination with Zytiga/Xtandi, will be a significant arsenal against mCRPC and result in recurrence-free survival of mCRPC patients.

Key words: Galectin-3, angiogenesis, picomolar blocks, T-cells, Zytiga

INVITED LECTURE

Early detection of breast cancer: Better future of Women health

Sharmistha Dey

Abhinay Kumar Singh¹, Renu Prajapati¹, Atul Batra²
Department of Biophysics¹ and Department of Medical Oncology²,
All India Institute of Medical Sciences, New Delhi, India
Email: sharmistha_d@hotmail.com

ABSTRACT

Early detection of metastatic breast cancer (MBC) is the serious issue to healthcare system. It is essential to develop potential non-invasive, low-cost molecular biomarkers. The present study explored specific serum proteins of inflammatory, MAPK and cytoskeletal signaling pathways, involved in progression of MBC to establish panel of blood based diagnostic and prognostic biomarker. Healthy-control (HC), non-metastatic (NM) and metastatic (M) (pre and post-therapy) breast cancer (BC) patients were recruited. LOX5, Rac1, Rac1b, p38 α , phospho-p38 α (Y182), LIMK1, phospho-LIMK1(T508), cofilin1 and phospho-cofilin1(S3) were quantified in the serum of study group by real time label free surface plasmon resonance technology and verified by western blot. Proteins were found to be significantly elevated in serum of BC patients compared to HC and also higher in M compared to NM which further downregulated in post-therapy M patients. Elevation of phospho-LIMK1 and phospho-cofilin1 which are critical for M were also indicated in the serum level and can differentiate from NM. Receiver operating characteristics (ROC) derived area under curve (AUC) (0.9) is very strong to differentiate between HC and BC. The panel of inflammatory cytoskeleton signaling regime proteins specified in this study can have significant clinical utility for diagnosis as well as prognosis of MBC at early stage. The study may have a high translational value in simple and cost-effective way by avoiding frequent CT/PET scans.

Key words: Breast cancer; Metastasis, serum protein marker; Cell Signaling.

INVITED LECTURE

**MICROTUBULE MODULATORS:
A GAME CHANGING ANTI-CANCER DRUGS**

Shobith Rangappa

Adichunchanagiri Institute of Molecular Medicine, Mandya

Email: shobithrangappa@gmail.com

ABSTRACT

The vital role played by microtubules in the cell division process, marks them as a potential druggable target to decimate cancer. A novel furan-2-carboxamide based small molecule is a selective microtubule stabilizing agent (MSA) with IC₅₀ ranging from 4 μ M to 8 μ M in different cancer cell lines. Inhibition of tubulin polymerization or stabilization of tubulin polymers abrogates chromosomal segregation during cell division, results in cell cycle arrest and leads to cell death due to the delayed repair mechanism. A novel furan-2-carboxamide based small molecule exhibited potent anti-proliferative and anti-metastatic property *In-Vitro* against the panel of cancer cells. Annexin V-FITC/PI, double staining reveals potent cytotoxic effect of SH09 against HeLa cells. FACS analysis displays induction of G2/M arrest and accumulation of subG1 population of cells upon treatment with SH09. Molecular docking study unveils SH09 binding affinity to the Taxol binding pocket of tubulin proteins and MM-GBSA also confirms strong binding energies of SH09 with tubulin proteins.

Key words:Microtubules, Tubulin Proteins, Taxol, Chromosomes

INVITED LECTURE

**Use of Lectins to Fight Cancer and pathogenic microbes:
Recent Findings and Mechanism of Action**

Imtiaj Hasan

Department of Biochemistry and Molecular biology
University of Rajshahi, Bangladesh
E-mail:hasanimtiaj@yahoo.com

ABSTRACT

Lectins are glycan-binding proteins found in all types of organisms. Along with other biological functions, a number of lectins isolated from plants and marine invertebrates showed bactericidal and antibiofilm effects against various pathogenic bacteria. Glycan-binding specificities of lectins might play a role here as the co-presence of ligand sugars can block these activities. Some lectins are effective only against gram-positive bacteria, some prevent the formation of biofilm by gram-negative bacteria, but cannot inhibit their planktonic growth. It can be suggested that these effects are not only dependent on sugar-binding properties, but also on several other factors.

Lectins also interact with glycans present in fungal cell walls, sometimes get internalized and inhibit their growth inducing the alteration of fungal cell walls, disturbance of spore germination and synthesis of chitin. In addition, lectins possess antiproliferative activity against different cancer cell lines following multiple apoptotic and necrotic pathways, which sometimes overlap with each other. Significant alterations of the expression of apoptosis-related genes have also been observed.

Lectins have the potential to be used as therapeutic alternative drugs, minimizing adverse effects of conventional drugs to treat cancer and diseases caused by multidrug-resistant and biofilm-producing organisms. Exploring the mechanism of action of such biological activities of lectins is very important to apply those in combination with certain antibiotic and anticancer drugs. This concept goes well with the 'New Biology' approach through the integration within biology for the improvement in human health.

Keywords: Lectins, glycan-binding proteins, fungal cell walls, anti-cancer drug

SPECIAL LECTURE

On the road to the discovery of new, more effective and useful biomarkers

Bishnu Pada Chatterjee

Department of Oncogene Regulation
Chittaranjan National Cancer Institute, Kolkata

Email: cbishnup@gmail.com

ABSTRACT

Non-invasive biomarkers, such as those from serum, are ideal for disease prognosis, staging and monitoring. The potential biomarkers derived from serum glycoproteins for various liver disease including liver cancer as well as other cancers are described. Aberrant glycans associated with disease have come about from glycosylation analysis. In various diseases and cancers the fucosylation and sialylation expression are found to be significantly changed. Therefore, these aberrations in glycan structures can be utilized as targets to improve existing cancer biomarkers. The ability to distinguish differences in the glycosylation of proteins between cancer patients and control subjects emphasizes glycobiology as a promising field for potential biomarker identification.

Keywords: Biomarkers, Serum, Glycoproteins, Liver Diseases, Cancer

INVITED LECTURE

Metabolic Reprogramming in Ovarian Cancer Cell Affecting Tumour Progression

Sib Sankar Roy

CSIR-Indian Institute of Chemical Biology, 4 Raja SC Mullick Rd,
Jadavpur, Kolkata, India

Email:sibsankar@iicb.res.in

ABSTRACT

Cancer cells undergo adaptive changes that favour their survival and propagation. One such change is the metabolic reprogramming, where several pathways of metabolism and cellular bioenergetics are significantly altered in the tumor cells. Here, we will discuss about two aspects of metabolic alterations that were studied in our lab and are therapeutically important. a) We established the role of TME-derived cues in determining the altered bioenergetics in cancer cells. The direct influence of transcriptomic and bioenergetic profiles of cancer cells in governing their invasive fate, in response to a highly enriched onco-metabolite (Lysophosphatidic acid) in the ascites/serum of patients have been shown. The link between increased invasiveness and metabolic plasticity further re-establishes the critical role of metabolic adaptation of tumor cells as a driver of tumor progression (*Mol Oncology-2017; FEBS J-2018*).

LPA helps invasion through GPCR-mediated signaling and it could be an effective biomarker for ovarian cancer detection. Further LPA-receptors could be potential drug targets. b) To demonstrate another example of metabolic rewiring in tumour cells, we studied glutamine metabolic alteration in tumour cells. Glutamine is an essential nutrient for maintaining the TCA cycle in cancer cells yet they undergo glutamine starvation in the core of tumors. Cancer stem cells (CSCs), responsible for tumor recurrence and chemoresistance, are often found in the nutrient limiting cores. We observed that glutamine is not essential for the survival of cancer cells, while it is required for their proliferation. Glutamine starvation leads to the metabolic reprogramming in tumor cells with enhanced glycolysis and OXPHOS. Production of ROS induces dynamin-related protein-1 (DRP1) phosphorylation through MAPK-ERK1/2 signaling pathway. Moreover, p-DRP1 promotes mitochondrial fragmentation and enhances numbers of CSCs. Glutamine deprivation

induces perinuclear localization of fragmented mitochondria and reduction in proliferation rate, which are usually observed in CSCs. Inhibiting both glutaminase by L-DON and DRP1 by MDiVi-1 significantly reduced both the tumor growth and induction of stemness. The present data suggest that glutamine deficiency reduces cell proliferation, but increases the CSC population and hence the co-treatment of MDiVi-1/L-DON could be a useful approach to reduce the stemness as well as cell proliferation. Targeting glutaminase along with DRP1 could be a good therapeutic approach for management of the disease (*Cell Mol Life Sc, 2021*).

Keywords: Lysophosphatidicacid, Glutamine, Mitochondria, Cell proliferation

INVITED LECTURE

Fundamental Study of α -trefoil lectins for medical application

Yuki Fujii

School of Pharmaceutical & Sciences,
Nagasaki International University, Sasebo, Japan

E-mail: yfujii@niu.ac.jp

ABSTRACT

Marine animals are attractive target for drug discovery because of their genetic diversity. We discovered the two α -trefoil lectins, “SeviL” and “MytiLec-1” having anticancer and modulating effect of macrophage cells from mussels, *Mytilisepta virgata* and *Mytilus galloprovincialis*. Glycan array revealed that SeviL bound to asialo-GM1 expressed in cervical cancer HeLa cells and MytiLec-1 bound to Gb3 expressed in Burkitt lymphoma Raji cells, respectively. Administration of SeviL and MytiLec-1 to those cancer cells showed the apoptosis through the activation of MAP kinase and caspase-3/9. In addition, co-presence of haptenic sugar and lectins canceled the activation of signal molecules and cell death of cancer cells. On the other hand, SeviL have proliferated the macrophage cells by addition of range of 3-20 μ g/mL and it had also shown the morphological change and secretion of cytokines and chemokines. However, these phenomena were not occurred by lectin-glycan interaction. Primary structure of SeviL was the classified into R-type lectin by their feature. We advocated the “mytilectin” as the new family of primary structure of MytiLec-1 because there was no similarity with any other proteins when it was discovered. The fundamental study of these lectin will contribute to generate new drugs by targeting glycan related with disease in healthcare and medical fields.

Keywords: *Mytilus galloprovincialis*, Mytilectin family, Tertiary structure, Lectins

INVITED LECTURE

**Mitogen-activated protein kinase-activated protein kinase-2
as a novel molecular target in mitigating Head and neck
squamous-cell carcinoma**

Yogendra Padwad

Pharmacology and Toxicology Lab, CSIR-Institute of Himalayan
Bioresource Technology, Palampur, 176061, H.P.

Email: yogendra@ihbt.res.in

ABSTRACT

Head and neck squamous-cell carcinoma (HNSCC) ranks sixth among cancers worldwide. Significance of p38/MAPKAPK2 (Mitogen-activated protein kinase-activated protein kinase-2) pathway in cell stress, inflammation and tumor progression. Designing and validating the preclinical and clinical efficacy of potent therapeutics for better and strategies management of HNSCC to counter its prevalence worldwide is an unmet need. We have elucidated the role of MAPKAPK2 (MK2) in HNSCC pathogenesis in clinical tissue samples, MK2-knockdown (MK2KD) HNSCC cells and heterotopic xenograft mice model. Overexpression of MK2 in patient-derived tissue samples was observed. Increased stability of cyclin-dependent kinase inhibitor 1B (p27), mitogen-activated protein kinase phosphatase-1 (MKP-1) transcripts and decreased half-life of tumor necrosis factor-alpha (TNF- α) and vascular endothelial growth factor (VEGF) transcripts in MK2KD cells suggests that MK2 regulates their transcript stability. *In vivo* xenograft experiments established that knockdown of MK2 attenuates course of tumor progression in immunocompromised mice.

Altogether, MK2 found functionally important in HNSCC pathogenesis byregulating the transcript stability of key genes. Multi-ring-fused pyrrolones (MRFPy), semi-synthesized from natural precursors have been identified as potential small-molecule MK2 inhibitors through *in silico* and SPR (Surface Plasmon Resonance) based interaction studies. *In silico* and surface plasmon resonance (SPR) analysis revealed that synthesized analogues inhibit Mitogen-Activated Protein Kinase Activated Protein Kinase 2 (MAPKAPK2/MK2) involved in the progression of Head and Neck Squamous Cell Carcinoma (HNSCC). Further, cell-based assays revealed that PBS analogues inhibit MK2 activation and exhibit anti-proliferative effects in HNSCC cells. This opens avenue for further mechanism of

action studies and pre-clinical efficacy evaluation of developed analogues in the treatment of HNSCC.

Keywords: Squamous-cell carcinoma, Pathogenesis, Surface Plasmon Resonance

INVITED LECTURE

Novel approach for the early prediction of oral squamous cell carcinoma

Bharathi Prakash¹, Akshay Trimukhe², Gulab Khedkar²

¹Department of Microbiology, Manglore University College, Manglore

²Paul Hebert Centre for DNA Barcoding and Biodiversity Studies,

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

E-mail: bharathiprakash21@gmail.com

ABSTRACT

Oral squamous cell carcinoma (OSCC) is a subset of head and neck squamous cell carcinoma which encompasses at least 90% of all oral malignancies. OSCC is a problem with major concern not only because of consequential mortality but also the treatment rendered results in facial deformity and loss of function. Despite catastrophic progress in recent therapeutic approaches, the prognosis of OSCC is penurious with a poor survival rate in majority cases. Main reason is the lack of knowledge, variations in exposure to the environment, and behavioral risk factors coupled delayed patients' consultation to medical facility, usually at the terminal advanced stages of OSCC. Also, most of the routine diagnosis technique are not sufficient to detect the early eve of disease. It suggests the early detection of the disease is needed to improve the treatment outcome. To date very few early diagnostic tests are in practice or either are not affordable. In this direction, we explored oral microbiome studies of human subjects to explore the correlation with oral health. Oral microbiome is the collective genome of microorganisms that reside in the oral cavity. Any change in the healthy oral microbiome leads to oral dysbiosis which is a potent reason for many oral diseases including cancer. Such bacterial dysbiosis is associated with oral carcinogenesis. An evolving concept in cancer biology implicates the microbiome as an influential environmental factor modulating the carcinogenic process. In the present study 180 subjects were selected consisting of- cases and controls. The cases included 60 patients of Oral Potentially Malignant Disorders (OPMD) and 60 patients of OSCC. The results obtained showed the AlphaDiversity index in healthy controls, OPMD and OSCC was 10.31, 26.14 and 40.88 respectively, representing the greatest diversity of microbial species in OSCC cases. Specific microbial families were associated with diseased subjects which were not seen in healthy. In

conclusion, significant microbial signatures can be used to predict OSCC and OPMD well before the clinical scenario.

Key words: Oral health, cancer, microbiome, metagenomics, oral squamous cell carcinoma, Oral Potentially Malignant Disorders, diversity.

INVITED LECTURE

Synergistic potential of Andrographolide and Melatonin for metastatic colorectal cancer therapy.

Aditi Banerjee

Department of Pediatrics,
University of Maryland School of Medicine,
Baltimore, MD, USA. GlycoMantra Inc.,
Biotechnology Center at the University of Maryland,
Baltimore, MD, USA

Email:drbanerjeeaditi@gmail.com

ABSTRACT

Due to new and improved treatment regimens, colorectal cancer (CRC) mortality has diminished for decades. However, CRC still ranks as the third most diagnosed cancer worldwide. Therefore, a new therapeutic approach is needed to overcome colon spheroids (CSCs), a subpopulation of cancer cells responsible for disease recurrence, drug resistance, and metastasis. Aberrant β -catenin signaling, and angiogenesis are crucial for CSCs development. It is well-documented that andrographolide (AGP) and melatonin (MLT) have anti-carcinogenic properties. Our laboratory has documented that together, AGP and MLT have synergistic effects on metastatic colon cancer (mCRC) using a panel of metastatic CRC cell lines (HT-29, HCT-116, HCT-15, DLD-1). The synergism is confirmed by the Chou-Talalay Compusyn method and was validated in CSCs (HT-29s and HCT 15s) based on morphology, viability, and colony formation and in 5-FU drug-resistant cells (HT-29R and HCT-116R). The viability and stemness of CSCs were monitored by FDA propidium iodide staining and immunoblot for CD44, CD133, Nanog, Sox2, and Oct4. The combinatorial compound synergistically diminished stemness via increased reactive oxygen species (ROS) levels, reduced mitochondrial membrane potential, and ATP level. Decreased CSCs viability is due to the induction of unfolded protein response (UPR) mediated endoplasmic reticulum (ER) stress, inhibition of β -catenin expression and its down-regulatory signals, Cyclin D1, c-Myc. In addition, the drug combination exhibits translocation of phospho- β -catenin to the nucleus and dephosphorylation of β -catenin. Downregulation of β -catenin and its transcription factors (tcf4 and lef1) and GTP binding/G-protein-related activity were found in the dual therapy. *In vivo*, the intravenous injection of AGP+MLT slowed metastatic colon cancer, which is associated with a

significant reduction in microvascular density and tumor index. Immunohistochemistry for caspase 7 and β -catenin found increased apoptosis and downregulation of β -catenin signals. These effects were observed without adverse side effects. We further documented that AGP and MLT disrupted patient-derived organoid (PDOD) membrane integrity and decreased Ki-67 expression. Therefore, we conclude that this novel compound could be a potential therapeutic candidate for mCRC.

Key words: Melatonin, β -catenin, GTP binding, Colon cancer

SYMPOSIUM-IB

Current Trends in Health Care- Genetic Disorders & Communicable Diseases

INVITED LECTURE

Gut Microbiota in Health and Disease

Matam Vijay Kumar

UT Microbiome Consortium

Department of Physiology and Pharmacology

University of Toledo College of Medicine, Toledo, OH, USA

E-mail: matamvijay.kumar@utoledo.edu

ABSTRACT

The mammalian gastrointestinal tract corrals trillions of bacteria that are collectively referred to as the gut microbiota. However, mice lacking Toll-like receptor 5 (TLR5) are unable to regulate their gut microbiota, thus resulting in a state of dysbiosis that elicits a spectrum of chronic diseases in a microbiota-dependent manner. We demonstrate that *Tlr5*KO mice developed spontaneous colitis in 10% of the mice and that this disease can be rescued by genetic ablation of LPS receptor, TLR4 (*J Clin Invest*, 2007). *Tlr5*KO mice that were non-colitic instead exhibited hyperphagia and developed hallmark features of metabolic syndrome, including hyperlipidemia, hypertension, insulin resistance, and increased adiposity.

These metabolic changes correlated with changes in the composition of the gut microbiota, and transfer of the gut microbiota from *Tlr5*KO mice to wild-type germ-free mice conferred many features of metabolic syndrome to the recipients (*Science*, 2010). Metabolomic and lipidomic analyses, respectively, revealed the elevation in short-chain fatty acids (SCFA) in ceca and hepatic portal blood and increased in hepatic oleate [C18:1]. Dietary SCFAs further aggravated their metabolic syndrome; conversely, deletion of hepatic stearoyl-CoA desaturase-1 (SCD1; a lipogenic enzyme) not only prevented hepatic oleate enrichment but also ameliorated metabolic syndrome in *Tlr5*KO mice (*Cell Metabolism*, 2015). Feeding dietary inulin (a soluble fiber that is fermentable by gut bacteria into SCFAs) to *Tlr5*KO mice ameliorated their metabolic syndrome but unexpectedly induced cholestasis that progresses to icteric hepatocellular carcinoma (HCC), a type of primary liver cancer. Pharmacologic inhibition of fermentation or depletion of fermenting bacteria markedly reduced intestinal SCFA and prevented inulin-induced HCC (*Cell*, 2018). Intervening with vancomycin to selectively deplete Gram-positive bacteria, which comprises the major producers of SCFA

and toxic gut microbiota-derived secondary bile acids, also conferred protection against such HCC (Gut Microbes, 2020). Recently, we delineated the mechanism for gut microbiota dependent liver cancer not only in *Tlr5*KO mice but also most widely used C57BL6 mice (aka wild type) fed on fermentable fiber diet is due to presence of extrahepatic shunt (*Gastroenterology*, 2022). Taken together, our extensive studies on gut microbiota advance the emerging view that the dysbiotic gut microbiota contributes to low-grade chronic inflammation resulting in new age diseases such as obesity, type II diabetes, fatty liver and liver cancer.

Keywords: Gut microbiota, Germ-free mice, Hepatocellular carcinoma, Liver cancer

INVITED LECTURE

Adipocyte insulin resistance: New age systems biology to identify early stage regulators

Anil N Gaikwad

Pharmacology Division,
CSIR-Central Drug Research Institute, Lucknow

E-mail: anil gaikwad@cdri.res.in

ABSTRACT

In history of human civilization energy homeostasis is central to human evolution. There are three major energy homeostatic organs -liver, adipocyte and skeletal muscle. Amongst them, adipose tissue is one sixth of body weight and vital endocrine organ. It has high stake in the development of metabolic disorders consequent to development of insulin resistance. In order to understand early regulators of insulin resistance development, we have developed hyperinsulinemia exposed human mesenchymal stem cell derived adipocyte as model system. Exploiting this insulin resistant adipocyte model system, we performed differential miRNA, Circular RNA and gene expression analysis and have identified early-stage miRNA and Circular RNA regulators. I shall be discussing this study in detail in my presentation.

Keywords: Adipocyte,Skeletal muscle,Circular RNA,Adipose tissue

INVITED LECTURE

Taurine activates SIRT1/AMPK/FOXO1 signaling pathways to favorably regulate lipid metabolism in HepG2 cells and C57BL6 obese mice

Asha Martin

Department of Biochemistry,
CSIR – Central Food Technological Research Institute, Mysore, India
E-mail: ashamartin@cftri.res.in

ABSTRACT

Sirtuins are NAD⁺ dependent class III histone deacetylases implicated in several age related degenerative diseases such as cancer, diabetes, cardiovascular disease (CVD) and neurodegenerative disorders. As sirtuins are attractive therapeutic targets, considerable effort has been expended towards developing specific sirtuin activators and inhibitors as treatments for metabolic disorders and age-related conditions. Molecules that activate sirtuin provide broad health benefits with potent anti-inflammatory, cardioprotective, neuroprotective, and anti-tumor activities. Amongst the known mammalian sirtuin homologues (SIRT1-7), SIRT1 (Silent information regulator T1) has emerged as a promising molecular target for the treatment of several diseases. Hyperlipidemia, a lipid metabolism disorder characterized by elevated plasma triglyceride and/or cholesterol levels is a risk factor for cardiovascular diseases and atherosclerosis that are grave public health issues. Taurine, a sulfur-containing non-essential amino acid, exerts a wide-range of physiological effects that aid in the regulation of lipid metabolic disorders. Although the effects of taurine on lipid lowering have been reported in animals and humans, mechanisms underlying the lipid lowering action of taurine remain to be defined. In the past few decades, a series of molecular regulators and regulatory pathways linked to lipid metabolism have been identified. Lipid metabolic enzymes undergo significant changes during taurine treatment. Using a combination of *in vivo*, *in vitro* and computational approaches, we have shown for the first time that taurine exerts lipid lowering effects through activating SIRT1/AMPK/FOXO1 signaling pathways and regulating their downstream targets. Our findings demonstrate that taurine functions as a natural SIRT1 activator with possible therapeutic benefits for metabolic disorders like obesity and age-related diseases.

Keywords: Sirtuins, Taurine, Hyperlipidemia, Obesity

INVITED LECTURE

**Structure based investigation of natural compounds as SARS-CoV-2
M^{pro} antagonists**

Umesh Yadava

Department of Physics
DDU Gorakhpur University, Gorakhpur, INDIA
E-mail: umesh.phy@ddugu.ac.in

ABSTRACT

From the time when the pandemic caused by SARS-CoV-2 was first reported from Wuhan, China, there has been a heave in scientific research to find a permanent cure for this disease. For the drug discovery SARS-CoV-2 M^{pro}, a crucial enzyme in the viral pathogenesis, is documented as a potential therapeutic target. The identification of natural compounds as antagonist against SARS-CoV-2 has been recommended as the fast and effective alternative for the drug development. In the present study, a total of 653 natural compounds have been identified through high throughput virtual screening approach utilizing NP-lib database. The top ranked compounds namely, 2,3-Dihydroamentoflavone (ZINC000043552589), Podocarpusflavon-B (ZINC000003594862), Rutin (ZINC000003947429) and Quercimeritrin 6"-O-L-arabinopyranoside (ZINC000070691536) were considered for stringent molecular docking using XP protocol of GLIDE, after geometry optimization by means of DFT method. Each compound exhibited substantial docking energy > -12 kcal/mol and molecular contacts with essential residues, including catalytic dyad (His41 and Cys145) in the active pocket of SARS-CoV-2 M^{pro}.

We have also carried out the structure-based screening of natural products from *Echinacea-angustifolia*, commonly used to prevent cold and other microbial respiratory infections, targeting M^{pro} of SARS-CoV-2. Four natural products namely, Echinacoside, Quercetagetin-7-glucoside, Levan N Inulin from chicory, and 1,3-Dicaffeoylquinic acid, revealed significant docking energy (> -10 kcal/mol) in the catalytic pocket. The screened compounds were further examined via ADME/T, quantum chemical calculations, combinatorial molecular dynamics simulations and hybrid QM/MM approaches. Persuasively, composed results indicated the potent compounds for drug likeness and strong binding affinity with the catalytic pocket of SARS-CoV-2 M^{pro}. Henceforth, the

chosen compounds are advocated as potential inhibitors of main protease and can be exploited in drug development to combat SARS-CoV-2 infection.

Keywords: SARS-CoV-2 M^{pro}, NP-lib database, Catalytic pocket

INVITED LECTURE

Immuno – proteomic studies of Rheumatoid arthritis and Osteoarthritis

Sagarika Biswas

Council of Industrial Research (CSIR)-Institute of Genomics and Integrative Biology, Mall Road, Delhi University Campus, Delhi, India

E-mail: sagarika.biswas@igib.res.in

ABSTRACT

Rheumatoid arthritis (RA) and Osteoarthritis (OA) are the two major disease belonging to arthritis disease. Both are inflammatory disease. However, RA is an autoimmune disease with a clinical manifestation both systemic and in joints whereas OA is a non-autoimmune inflammatory disease of joints with loss of cartilage. RA disease is affecting at any age whereas OA is affecting people at older age. Arthritis affecting nearly 1.0-1.5% population worldwide, women are more affected than men, affecting joints and other organs like eye, lungs, heart, resulting into degradation of quality life.

The etiology behind the disease (RA/OA) is not known. In spite of various advancement in the medical history, negligible/no specific biomarkers is available to facilitate the diagnosis and treatment of OA/RA. In general Disease-modifying anti-rheumatic drugs (DMARDs) and Non-steroidal anti-inflammatory drugs (NSAIDs) are recommended medicine in various doses along with other supplementary drugs depending upon the severity of disease. But these drugs are generally causing various side effects such as vomiting, headache etc. Thus, identification of novel, clinically applicable and specific disease associated proteins biomarkers are essentially needed to be discovered and identification of their role to uncover the disease pathogenicity at an early-stage is needed.

We, therefore used the proteomic/advanced immune-proteomic techniques to study and identify the most significant differential proteins. Differentially expressed proteins were identified by two dimensional gel electrophoresis (2-DE), isobaric tag for relative and absolute quantitation (iTRAQ) method followed by Liquid Chromatography with tandem mass spectrometry (LC MS/MS) analysis and validated by Western-Blot and

Enzyme-Linked Immunosorbent Assay (ELISA). The identified protein was then further validated by in-vitro and in-vivo studies followed by pathway analysis using bioinformatic tools thus contributed in understanding the pathogenesis of disease.

Keywords: Rheumatoid arthritis, Osteoarthritis, pathogenicity, Liquid Chromatography

INVITED LECTURE

Molecular docking and dynamics simulation study reveal multi-target anti-hyperglycaemic properties of (-)- epicatechin: through *in vitro* and *in vivo* validation to treat Diabetes mellitus

Estari Mamidala

Infectious Diseases Research Lab, Department of Zoology,
Kakatiya University, Warangal, Telangana State, India

E-mail: drestari@kakatiya.ac.in

ABSTRACT

Diabetes mellitus is a group of metabolic diseases striking by hyperglycemia initiated by insulin action. Diabetes associated chronic hyperglycemia is related to long-term injury, dysfunction, and disaster of numerous organs, with the eyes, heart, blood vessels, kidneys and nerves. The purpose of this study was to assess epicatechin's anti-diabetic effectiveness *in vitro* and *in vivo*. This study aimed to assess epicatechin's antidiabetic effectiveness *in vitro* and *in vivo* and on the regulation of hyperglycemia in alloxan-induced diabetic wistar male albino rats. The experimental rats were given epicatechin at doses of 100, 200 and 400 mg/kgbw orally for three weeks. Epicatechin's ability to control hyperglycemia was compared to that of metformin at the recommended dose (5 mg/kgbw orally). Epicatechin was found to have hypoglycemic action, as verified by a considerable drop in blood glucose levels. After ingesting 400 mg/kgbw of epicatechin, the diabetic animals' blood glucose levels declined from 308.62 mg/dl to 125.25 mg/dl on the 21st day. The effects of metformin at a dosage of 5 mg/kgbw on blood glucose altitudes were compared. *In silico* molecular docking studies were used to validate epicatechin's anti-diabetic effects. Epicatechin has the utmost binding affinity against alpha-glucosidase, with a binding affinity of -9.41 kilocalories/mol, and interrelates with four H2 bonds with GLY: 533; ARG:520; SER:521. We consider that this epicatechin could be used as an anti-diabetic medication in preclinical research to battle diabetes mellitus. Epicatechin should be further investigated to develop as a potent anti-diabetic medicine, based on the *in silico* molecular docking and simulation results.

Keywords: Diabetes mellitus; insulin; hyperglycemia; metformin; enzymes

SYMPOSIUM-II

Stem Cells & Regenerative Medicine

INVITED LECTURE

Stem cell renewal pathways associated with development of uterine cervical carcinoma: Clinical implications

Chinmay Kumar Panda

Department of Oncogene Regulation, Chittaranjan National Cancer Institute, 37, S.P. Mukherjee Road, Kolkata-700026, CSIR-Indian Institute of Chemical Biology, Raja Subodh Chandra Mallick Rd, Jadavpur, Kolkata
Email:ckpanda.nci@gmail.com

ABSTRACT

Globally, uterine cervical carcinoma (CACX) is the fourth most common female cancer. In eastern India, it is the second most common cause of gynaecological malignancies. Persistent infection of high-risk Human Papillomavirus (HR-HPV) e.g. HPV type 16, 18, 33 etc., is the common and important etiological factors associated with CACX development. HPV infection occurs through proliferating squamo-columnar junction of cervical epithelium causing non-random sequential chromosomal aberrations and perturbation of cellular pathways leading gradual transformation of the region to cervical intraepithelial neoplasia (CIN) and ultimately to malignant CACX. To find out the cellular pathways associated with the development of CACX, at first, high-resolution whole-genome copy number variation (CNV) was analyzed using CGH-SNP microarray analysis (GSE76911) to find out frequently altered (amplified/deleted) chromosomal regions followed by validation of the altered regions by microsatellite markers and STS markers.

The genes present in the frequently altered chromosomal regions with altered expression were then identified by expression (mRNA) microarray analysis (GSE122697) followed by the Ingenuity® Pathway Analysis (IPA®) of the differentially expressed genes (DEGs) to find out the cellular pathways associated with the development of CACX. The pathways include stem self renewal, cell signalling, cell cycle, apoptosis, epigenetic regulation, DNA repair etc. Among these pathways, at first, association of stem cell renewal Wnt and Hedgehog pathways with the development of CACX was validated in independent set of primary cervical lesions at different clinical stages and CACX cell lines. Among the key regulatory genes of the pathways, up-regulation of the agonists β -catenin/ p- β -catenin (Y654), Wnt3a, SHH, SMO and Gli-1, and down regulation of antagonists APC, PTCH1, HHIP and SUFU were seen in the proliferating

basal-parabasal layers of cervical epithelium irrespective of HPV infection. The expression profile of the genes in the basal-parabasal layers of cervical epithelium did not change significantly during development of CACX except additional deletion and/or methylation of the antagonists. The promoter methylation status of the antagonists was validated by in vitro demethylation experiments using 5-aza-dC in CACX cell lines. The activation of the effector proteins of the pathways β -catenin / Gli-1 showed association with inactivation of the antagonists of the respective pathways. Alterations of the genes of the pathways were seen to be associated with mainly early invasive lesions and poor prognosis of the disease. The importance of the antagonists HHIP and SUFU was evaluated in CACX cell lines after treatment with chemotherapeutic drug cisplatin. It was evident that cisplatin could restrict the growth of CACX cell lines HeLa and SiHa through upregulation of HHIP and SUFU due to promoter hypo-methylation in a concentration dependent manner without any significant changes in the expression of SHH, SMO and GLI1, suggesting therapeutic importance of the antagonists.

Keywords: Cervical Carcinoma, Micro Array Analysis, Cell Cycle, Antagonists

INVITED LECTURE

Targeting stemness of cancers by modulating the Wnt signalling pathway

Sudha Warriar

Wnt Lab

Cancer Stem Cells and Cardiovascular and Neuronal Regeneration

Manipal School of Regenerative Medicine,

Manipal University, Bangalore, India

Email:sudhawarrier30@gmail.com

ABSTRACT

Cancer stem cells (CSCs) are hypothesized to be the pathological counterpart of normal somatic tissue stem cells. The CSC model proposes that tumours are organised hierarchically with a subset of tumour cells at their apex, which possess self-renewal and multilineage differentiation potential. Cancer stem cells, unlike the bulk of the cells within the tumor, are elusive to drug treatment and are unaffected on chemo and radiotherapy. These self-renewing cells are responsible for the flare up of cancer and remission long after treatment. Cancer stem cells have a capacity for unlimited self-renewal, as well as the ability to initiate and drive tumor progression in an animal model.

Activated Wnt/ β -Catenin signaling is a key feature of epithelial cancers and is critical for metastasis and epithelial-mesenchymal transition (EMT), a signature trait of CSCs. We explored the effect of the Wnt antagonist, secreted frizzled related protein 4 (sFRP4) in CSCs in solid tumors. We found that sFRP4 chemo-sensitizes CSC-enriched cells to commonly used drugs, by the reversal of EMT and by decreasing drug effluxers. sFRP4 acts at multiple levels of the Wnt- β -Catenin and the Wnt-calcium pathways in inhibiting CSCs. We also identified a novel mechanism of action of sFRP4. These findings could be exploited for designing better targeted strategies to improve chemo-response and eventually eliminate glioblastoma CSCs.

We also looked into the effect of natural compounds like diosgenin (DG) and ursolic acid (UA) and found that they had a potent inhibitory effect on breast cancer cells by not only inducing apoptosis but also by reducing the stemness properties and decreasing the CSC population. As self-renewal and chemoresistant properties of CSCs are linked to the Wnt

β -catenin pathway, we hypothesized that the observed effects of these compounds on CSC could be through modulating this pathway. Our results clearly suggest that plant derived compounds such as DG and UA are capable of targeting cancer stem cells and exert their effect by antagonizing the Wnt- β -catenin pathway.

Keywords: Cancer Stem Cells, Ursolic Acid, Radio therapy, Skin Tissues

INVITED LECTURE

**Reprogramming Stem Cells for Transplantation –
A Regenerative Therapy for Diabetic Wounds**

Amitava Das

Department of Applied Biology, CSIR-Indian Institute of Chemical
Technology, Uppal Road, Hyderabad-500007, India

E-mail : amitavadas.iict@gov.in

ABSTRACT

Stem cell-mediated tissue regeneration is often challenged due to multiple factors ranging from harsh microenvironment at the injury site to low bio-availability upon systemic stem cell transplantation that limits the engraftment, viability, proliferation, and differentiation-mediated damaged tissue regeneration. My lab has been working in addressing each of these challenges of stem cell transplantation therapies. Using the 'stem cell gene therapy' approach, we have established an *intravenous* transplantation of allogenic stable MSCs with *Cxcr6* gene therapy that potentiated skin tissue regeneration by increasing its recruitment and engraftment at wound site in excisional splinting wounds of type 1 and 2 diabetic mice thereby signifying the CXCL16-CXCR6 axis as a potential therapeutic target for the treatment of non-healing diabetic wounds (*Molecular Therapy* 2020). Additionally, 'reprogramming' of Wharton's Jelly-derived MSCs into reprogrammed ECs (rECs) using unique transcription factor, TWIST1 increased the vasculogenic potential of rEC. Transplantation of stable TWIST1-rECs into murine diabetic wounds enhanced the microcirculatory blood flow and accelerated wound tissue regeneration (*Diabetes* 2020). This lecture will highlight the intricate molecular mechanisms in MSCs and an understanding of stem cell fate at the injury microenvironment with a promising therapeutic approach for skin tissue regeneration in diabetic foot ulcers.

Keywords: Systemic Stem Cell, Stem Cell Gene Therapy, Skin Tissue Regeneration

INVITED LECTURE

Nanofabricated Biomaterials for Corneal Epithelial Regeneration

Geetha N

Nanobiotechnology Laboratory, DOS in Biotechnology, Manasagangotri,
Mysuru, Karnataka

Email: geethabiotech.uom@gmail.com

ABSTRACT

Regenerative medicine, an interdisciplinary field encompassing many fields of science and medicine to promote regeneration can potentially restore diseased and injured tissues and whole organs. Since biomaterials are acquiring global interests, regenerative medicine can make it more accessible to achieve strategies such as cell-based therapies, artificial organs, and engineered living tissues. Indeed, it is in one direction with the ultimate goal of nanofabricated biomaterials, which is the research and development of materials other than drugs for applications in medicine. Attempts to discover novel and adequate biomaterials-based substrate, which would pave problems in regenerative medicine and tissue engineering has afforded to tailor and emerging extent biomaterials with various forms, including fibers, gels, hydrogels, sponges, films as a carrier for transplantation, construction-permanent medical implants, devices, and scaffolds. In the preset study, we have prepared collagen/ chondroitin sulphate nanofiber scaffolds and checked for corneal epithelial bioengineering. Cross-linking of chondroitin sulphate along with chemical cross-linkers such as glutaraldehyde and 1-thyl-3(3-dimethyl-aminopropyl)-1-carbodiimide hydrochloride/N-hydroxy succinimide enhanced the mechanical integrity of the scaffolds and also increased degradation stability. Fabricated nanofiber scaffolds showed more biocompatibility in corneal epithelial cell attachment. Higher level differentiation process of culture cells showed the directional differentiating potential into corneal epithelium *in situ*. The resultant scaffolds are found to be more potential in tissue engineering applications with reference to the growth, proliferation and differentiation of corneal epithelium. This research work is highly application-oriented with a great potential in clinical applications.

Keywords: Biomaterials, Corneal Epithelium, Hydrogels, Scaffolds, Cross linkers

SYMPOSIUM-III

New Biology

INVITED LECTURE

**In Vitro Antimicrobial Studies of Zinc Oxide Nanoparticles
Synthesized Using *Delonix Regia* Extract As Biological Template**

Manjunath K.

Department of Microbiology, Biotechnology and Food technology,
Bangalore University, J.B. Campus, Bangalore-56, Karnataka, India

E-mail: ushamanjunath58@gmail.com

ABSTRACT

Nanotechnology is emerging as an important area of research with its tremendous applications in all fields of science, engineering, medicine, pharmacy, etc. due to their unique properties, nano particles have gained considerable importance compared to bulk counterparts. Biological reduction agents are being explored worldwide to minimize the effects of toxic chemicals for nanoparticle fabrication. The present study states a green approach for the synthesis of zinc oxide nanoparticles (ZnO NPs) employing aqueous leaves extract of *Delonix regia* as the reducing agent for synthesizing ZnO NPs from zinc nitrate hexahydrate by combustion method at 420 °C. The resultant nanopowder was characterized using various characterization tools such as UV-visible spectroscopy, X-ray diffraction, Scanning electron microscopy and Transmission electron microscopy. Bioassay against pathogenic bacterial strains performed by broth dilution technique using antibiotic (tetracycline) as positive control and antifungal activity by food poison technique. Nanoparticle exhibit significant bactericidal and bacteriostatic effects against Gram positive (*Bacillus cereus* and *Staphylococcus aureus*) and Gram negative (*Escherichia coli* and *Pseudomonas aeruginosa*) pathogens in the range 0.25-25 µg/ml. Antifungal effect of ZnO NPs against plant pathogenic fungi such as *Phomopsis azadirachtae*, *Fusarium oxysporum* and *Alternaria alternata* was in the range of 100-300 µg/ml..

The present work exhibited straightforward, inexpensive and eco-friendly procedure for synthesizing ZnO NPs. The synthesized ZnO NPs exhibited an excellent antimicrobial activity and provided helpful insight into the development of new groups of antimicrobial agents. ZnO NPs are increasingly used for the therapy, diagnosis, and monitoring of disease or drug-induced mechanisms in the human biological system. Nanotechnology is particularly advantageous in the field of neurology. Examples may include the utilization of nanoparticle (NP)-based drug

carriers to readily cross the blood–brain barrier to treat central nervous system (CNS) diseases, nanoscaffolds for axonal regeneration, nanoelectromechanical systems in neurological operations, and NPs in molecular imaging and CNS imaging.

Keywords: Delonix regia, Scanning electron microscopy, ZnO NPs, Phomopsis azadirachtae

INVITED LECTURE

Survival of *Entamoeba* during stress and Encystation

Sudip K. Ghosh

Department of Biotechnology,
Indian Institute of Technology Kharagpur, Kharagpur, India
E-mail: sudip@bt.iitkgp.ac.in

ABSTRACT

Entamoeba histolytica, the causative agent of amoebiasis, infects human through chitin walled cyst. Encystation occurs under stress, like starvation. Since *E. histolytica* cannot be encysted *in vitro*, its reptilian counterpart, *E. invadens* is used to study encystation as their cysts have similar characteristics. This work is to find out how *Entamoeba* manages the starvation and convert them to environment resistance cyst. *Entamoeba* develops several survival strategies to overcome the starvation and other stress conditions and activate number of genes to initiate autophagy and apoptosis. We have identified the involvement of UDP-sugar transporter during chitin wall synthesis. From the transcriptomic study, we have also identified three novel putative kinase genes, namely AMPK, MAPK, and EiCSPK1, which were found to be exclusively encystation specific in *Entamoeba invadens*. These three *Entamoeba invadens* encystation specific kinases (EiCSpk) were found to be important in the early encystation signaling. In our recent study, we found that one out of seven putative topoisomerases is stress-responsive and plays a crucial role during encystation.

Keywords: *Entamoeba histolytica*, Topoisomerases, *Entamoeba invadens*

INVITED LECTURE

Metagenome profiling of anterior uterine samples to improve *in vitro* fertilization success

Gulab Khedkar¹, Manju Jilla², Bharathi Prakash³

¹Paul Hebert Centre for DNA barcoding and biodiversity Studies,
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.

²Jilla Hospital and IVF Centre, CIDCO, Aurangabad.

³ Department of Microbiology, University College, Mangalore.

E-mail: gdkhedkar@gmail.com

ABSTRACT

The rise in the number of couples experiencing infertility, or the inability to conceive naturally, has piqued the attention of researchers all over the world. The main focus is to determining the fundamental cause of infertility specifically the unexplained fertility. The presence of certain pathogenic flora in the cervix and vaginal region are often attributed to the failure of In-vitro fertilization (IVF), which is a method of assisted reproduction. This study explored the cervix and vaginal microbiota of 52 such infertile females who underwent assisted reproduction (IVF), to analyse the microbiota using metagenomic approach, identify pathogenic flora and evaluate the diversity of the flora. Dysbiosis in the cervical and vaginal region is often attributed to decrease in *Lactobacillus spp.* and increase in other species, leading to difference in functionalities and growth of pathogens. In this study, the presence of pathogenic organisms in both regions was remarkable. Additionally, large bacterial diversity in cervical regions was observed, which might be a possible reason for implantation failure. Further studies on the mechanism of action of these bacteria is needed; the possible sources of contamination, such as the tip of the catheter during embryo transfer during the procedure. By using more sterility in the procedure as well as profiling the metagenome of the infertile female, novel insights can be gained as well as a more directed procedure can be performed to increase the chances of success in implantation.

Keywords: In-Vitro Fertilization, metagenome, cervix, vagina, infertility, assisted reproductive technology

INVITED LECTURE

Characterization, antimicrobial activity, and molecular docking studies of ellagic acid from *Xylaria acuta* isolated from endophytic fungi.

Srinivasa Chowdappa, Sumanth B
Department of Microbiology, Bangalore University,
Jnana Bharathi Campus, Bengaluru
E-mail: srinivasbub@gmail.com

ABSTRACT

In the most recent decade, there has been a dramatic increase in fundamental microbial disease's pervasiveness. The evolution of the multi-drug resistant organisms (MDRO's) is because of the broad usage of commercial antibiotics, which means the previously active antibiotics are now limited in their efficacy. Therefore, this work was designed to examine the antibacterial and antifungal potential of ellagic acid from *Xylaria acuta* of *Millingtonia hortensis* L.f. The extraction of the compound from the extracellular filtrate of the endophytic fungi was performed utilizing the solvent extraction process. The synthesized compound was confirmed as ellagic acid by spectroscopic and chromatographic techniques like UV-VIS, FTIR, TLC, HPLC, GCMS, and NMR. The antibacterial assay was performed by the agar well diffusion method, and MIC and MBC were performed by the broth microplate dilution method. The antifungal activity was carried out by the food poison method. *In silico* docking studies, molecular interactions and inhibitory properties of ellagic acid were analysed against bacterial and fungal targets performed using Autodock Vina. The purified compound was characterized as ellagic acid, and it showed antimicrobial activity against bacterial and fungal pathogens. MIC of ellagic acid was 62.5 µg/ml against *S.aureus* and *E. coli*. Docking results predict the lowest binding free energy against the bacterial target of *S.aureus*, and the fungal target of *C. cladosporioides* was -10.3 and -8.7 kcal/mol, respectively. These results show that ellagic acid is a strong alternate compound for inhibiting bacterial targets and is moderately considered an antifungal agent.

Keywords: Microbial diseases, spectroscopic, chromatographic, antimicrobial, molecular docking.

INVITED LECTURE

Multifaceted applications of mycoendophytes metabolites in antibiotic resistance era

Satish S^{1*}, Chandra Mohana N ^{1,2}

¹ Department of Studies in Microbiology, University of Mysore,
Manasagangotri, Mysuru, Karnataka, India

²Department of Microbiology, Yuvaraja's College (Autonomous),
University of Mysore, Mysuru, Karnataka, India

Email:satishs100@gmail.com

ABSTRACT

Mycoendophytes are symbiotic in natural plant ecosystems and they have been documented in all plants globally. They colonize the internal tissues of host plants in varied relationships viz., symbiosis, mutualism and commensalism. Mycoendophytes aid their host by producing wide range of natural products with potential applications in medicine, agriculture or industry. Recent isolation, culture, purification, and characterisation of potential endophytes have led to the discovery of novel antibiotics, antimycotics, immunosuppressants, and anticancer analogues, to name just a few. Various structural classes of secondary metabolites that have been identified from endophytes include alkaloids, peptides, steroids, terpenoids, phenols, quinones, and flavonoids. It is quite likely that innovative drugs will be found that can be used to treat diseases that are arising in humans, plants, and animals.

Keywords: Secondary metabolites, mycoendophytes, novel antibiotics, healthcare

INVITED LECTURE

Nano Silk-fibroin biomaterial composites for accelerated healing of injuries

Mamatha D M¹, Sufia Sultana² & Dr. P. SnehaLatha³

¹² Dept of Bio Sciences & Sericulture

³Dept of Mechanical Engineering, SoET

Sri Padmavati Mahila Visvavidyalayam (Women's University), Tirupati,
A.P.

E-mail: mamatha@spmw.ac.in

ABSTRACT

The Mulberry and Non-mulberry silks (Tasar, Eri &Muga) have been acknowledged as a reliable source of raw materials to create silk-based bio materials because of their excellent biocompatibility, tuneable mechanical strength and regulated biodegradability. They can be explored in various biomedical applications including drug delivery and Tissue engineering. Exploring the strengths of the mulberry and Non mulberry silks towards the development of silk biomaterials, Silk composites and Nano Bio silk composites development is one promising thrust area where India can rely on for the next two decades in the field of biomedical industry hitting the Global biomaterial market.

During the last five years at the World platform the Global Biomaterial market is expected to scope USD 47.5 billion by 2025 from USD 35.5 billion in 2020 at the Compound Annual growth rate (CAGR) of 6%. In the recent years the research studies started exploring the efficiency of silk proteins viz the Sericin and Fibroin in the process of wound healing. The wound healing is an intricate process with overlapping phases of haemostasis (Clotting), inflammation, proliferation (granulation tissue formation) and new tissue remodeling. To augment the acceleration of wound healing the above-mentioned silk variants need to be explored much to make them highly efficient and dependable.

The expression of wound healing components was analysed by immunohistochemistry and expressing mRNAs for interleukins (ILs-1, IL-6, IL-18), Tumour necrosis factor (TNF) and vesicular endothelial growth factor (VEGF) through Real-Time PCR studies. Thus developed biomaterials were further characterized through FTIR analysis, X-ray diffraction, Multi angle Dynamic Light Scattering -Zeta potential and etc. The current study enhances our understanding of the opportunities and

challenges related to silk and silk-based composites in augmenting the process of injuries healing with special reference to burns.

Keywords: Nano Silk biomaterial composites, Injuries/wound healing.

INVITED LECTURE

Agrowaste and lignin as a source of potent antioxidant, antiaging packaging and cosmetic material

Harit Jha

Department of Biotechnology,
Guru Ghasidas Vishwavidyalaya, Bilaspur (CG)

Email: harit74@yahoo.co.in

ABSTRACT

Agrowaste considerable economic and environmental implications: not only does it represent a wasted investment, but it also has a negative environmental impact, due to the greenhouse gas emissions and inefficient use of water and land, which in turn can lead to diminished natural ecosystems. Agrowastes provide a high potential source of bioactive compounds, such as phenols and antioxidants, which could be exploited in the pharmaceutical, cosmetic, and food industries. Bioactive phytochemicals like sterols, tocopherols, carotenes, terpenes and polyphenols extracted from certain food waste contain significant amounts of antioxidant activities. The use of antioxidants in food packaging helps to delay both lipid oxidation and protein denaturation. Lignins are one of the major polyphenol found in the agrowaste material. The aromatic structure and numerous functional groups of lignin has attracted increasing attention for its effective utilization in film forming, development of polymers, adhesives, coating, additives, carbon fibers, activated carbon and as a corrosion inhibitor. Being an antioxidant agent lignin can be used as stabilizer to prevent or reduce the ageing of polymers.

The addition of lignin enhances the hydrophilicity, biocompatibility, biodegradability and thermal stability of the composites. Lignin thus find application as plasticizer in composites. The lignin has been reported to improve the properties of various biopolymers such as starch and gelatin and synthetic polymers such as poly(vinyl alcohol), poly(ethylene), poly(lactic acid), poly(vinyl chloride). Lignin have multifunctional structure tend to interact with protein and act as agonist and antagonist of different receptors viz neonatal Fc receptors, non-competitive inhibitor of α -glucosidase, lignin treatment suppresses adipose tissues and plasma triglyceride levels. It is suggested to be antiproliferative against various cancer cell lines. They reduce carbohydrate metabolism and

intestinal glucose absorption. Agrowaste and Lignin can thus be a major source of bioactive material and therapeutic agents.

Keywords: Agrowaste, Tocopherols, Carotenes, Terpenes

INVITED LECTURE

Antibiotic Resistance: An Emerging Health Concern

Atya Kapley

Environmental Biotechnology and Genomics Division
CSIR-National Environmental Engineering Research Institute (NEERI),
Nagpur

E-mail:atyakapley@gmail.com

ABSTRACT

Bacteria are known to adapt to stress conditions, acquiring the genetic capability required to deal with the contaminant, thus ensuring their survival, even in harsh environments. A fall out of this property is the current major health threat of antibiotic resistant bacteria (ARB). Untreated sewage contains antibiotics and various chemicals that promote bacteria to acquire resistance. These bacteria, if allowed to flow through the drains and reach any natural water body, have the capability to creating a community of ARBs via horizontal gene transfer. WHO has classified antibiotic resistance as a major health threat facing the globe. The first step in tackling this problem is the surveillance of target sites and identification of hotspots that are hubs for propagation of ARBs. Environmental surveillance using both cultivable approach, as well as genomic tools to detect antibiotic resistant genes (ARG) in the environment, is the need of the hour. Formulating a policy for compulsory monitoring of ARGs will go a long way in tackling this emerging health threat.

Keywords: Bacteria, Genetic capability, Antibiotic resistant genes

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IV

ABSTRACT OF ORAL PRESENTATIONS

SIA-OP-01

Synergistic Efficacy of Polyphenols against MCF-7 Breast Cancer Cell line

Rita Lakkakul¹ & Archana Moon²

^{1,2}Post Graduate Teaching Department of Biochemistry, L.I.T Premises,
RTMNU, Nagpur

Email: moon.archana@gmail.com

ABSTRACT

Breast cancer is the second greatest cause of malignancy in women worldwide and fight against cancer is one of the significant areas of research in medicine. Dietary polyphenols when act synergistically received considerable attention against breast cancer because of their ability to target multiple targets with low or no toxicity. An increasing evidences have shown the chemopreventive activities of polyphenols specifically Resveratrol, Epigallocatecholamine (EGCG) and Phenethylisothiocynate (PEITC). In the current study, PEITC, Resveratrol and EGCG were evaluated individually and in different combinations through dose dependant manner over the viability of MCF-7 breast cancer cell line. The cytotoxic concentrations to kill 50% of the cells (IC₅₀) were obtained using MTT assay. Synergistic, additive, and antagonistic effects were determined by using the combination index (CI) method. The effect was stronger than PEITC, Resveratrol and EGCG alone. The results suggest that treatment of MCF-7 cancer cells for 24 h, 48 h, and 72h PEITC, Resveratrol and EGCG severely inhibits cell growth and activates apoptosis by upregulation of caspase and direct modulation of cancer cells by inhibiting MMP-2 and MMP-9 activities which play key role in metastasis in breast cancer. Our results suggest that therapy PEITC, resveratrol and EGCG might be a possible way to prevent chemo resistance imparted while traditional anticancer drug therapy.

Keywords: Breast Cancer, Polyphenols, Metastasis, Synergism

S1A-OP-02

COL11A1 gene as a critical onco-biomarker: an integrated omics approach

Ritwik Patra, Suprabhat Mukherjee

Integrative Biochemistry & Immunology Laboratory, Department of
Animal Science,
Kazi Nazrul University, Asansol, West Bengal, India
Email: ritwikpatra8@gmail.com

ABSTRACT

COL11A1 is a critical component of extracellular matrix of the colon. This study evaluates the significance of COL11A1 gene in the progression of Colorectal cancer through differential expression, oncogenomic changes, PPI, survivability, and alteration in cancer-critical pathways using bioinformatics approaches. Our study signifies overexpression of COL11A1 in CRC that reduces survivability. Mutational studies imply perturbations in RTK-RAS-PI3K, Wnt, TGF- β , and TP53 signalling pathways influencing tumorigenesis. Positive correlation with THBS2, COL10A1, COL5A2, and COL1A2 is likely to contribute in upregulation of carcinogenesis. Conclusively, COL11A1 gene is a significant contributor in the aetiology of CRC and considered as prognostic biomarker of CRC.

Keywords: Human Colorectal Cancer; COL11A1; Biomarker; Differential expression; Oncogenomics; Survival assay; Bioinformatics

Terpenoids as Natural Modifiers of Plasma Membrane Structures and Dependent Signaling Pathways in Cancer

Siddhartha Kumar Mishra

Department of Biochemistry, University of Lucknow, Lucknow, U.P.,
India, Email: siddharthakm@yahoo.com

ABSTRACT

Chemosensitization of cancer cells with small molecules may improve the therapeutic index of antitumoral agents by making tumor cells sensitive to the drug regimen and thus overcome the treatment resistance and side effects of single therapy. Cell membrane lipid rafts are known to transduce various signaling events in cell proliferation. Identification of novel cellular sensitization methods exerting multiple effects on cancer cells growth has become an important aspect of anticancer therapeutic strategies. Certain signals related to cell growth and other physiological processes are transduced through discrete regions in the plasma membrane known as lipid rafts. Sensitizing cancer cells may cause modulation of membrane lipid rafts which may potentially be used in improving anticancer drug response. Natural products have currently been considered as primary sources for chemotherapeutic agents with promising antitumor activities with a wide range of bioactivities including anti-inflammatory, cytotoxic, and anti-proliferative effects. Terpenoids like resveratrol, artemisinin, thapsigargin, parthenolide, and andrographolide have shown promising pharmacological abilities to inhibit the growth of cancer cells through modulation of several key signaling pathways especially cell cycle, apoptosis, growth and proliferation, cell adhesion, migration and invasion, and metastasis. We have analyzed the effect of cedrol, a natural sesquiterpene alcohol, on human leukemia and colorectal cancer cells. Cedrol activated the caspase-9-dependent mitochondrial intrinsic pathway of apoptosis and inhibited the levels of pAKT, pERK, and pmTOR proteins. Cedrol caused redistribution of cholesterol and sphingomyelin contents from membrane lipid raft which appeared to be a novel mechanism of growth inhibition of cancer cells. Cedrol can be classified as a natural lipid raft-disrupting agent with possibilities to be used in general studies involving membrane lipid raft modifications.

Keywords: Plasma membrane, signaling, terpenoids, inflammation, apoptosis, cancer

S1A-OP-04

Fusobacterium nucleatum Fap-2 as a vaccine candidate for human colorectal carcinoma

Somrita Padma, Suprabhat Mukherjee

Integrative Biochemistry & Immunology Laboratory, Department of
Animal Science,

Kazi Nazrul University, Asansol West Bengal, India

Email: spadma03212@gmail.com

ABSTRACT

Colorectal cancer is one of the most common and second-highest in cancer-related death. Fibroblast activation protein-2 (Fap-2) is an essential membrane protein of *Fusobacterium nucleatum*, promoting adherence to the colon cell, recruiting immune-cell, and tumorigenesis. Herein, we designed an in-silico vaccine candidate against the B-cells and T-cells epitopes of Fap-2 demonstrating cell-mediated and humoral immune responses against CRC. The association of vaccine with TLR5 elicited potential immune responses. Furthermore, in-silico cloning within the expression vector and immune simulation validates the immunogenic report of the vaccine. Collectively, our vaccine construct may serve as a promising therapeutic intervention against pathogens-mediated human CRC.

Keywords: Human Colorectal Cancer; *Fusobacterium nucleatum*; Fibroblast activation protein-2 (Fap 2); Toll-like receptors (TLRs); Multi-epitope peptide vaccine; Cloning; Molecular docking; Bioinformatics

S1A-OP-05

Formulated Drug synthesized from Methanolic extarct of *Delonix regia* flower and Doxorubicin against cancer cell lines

Yamini Sudha Lakshmi

Department of Medical Biochemmistry, University of Madras, Taramani
Campus, Chennai

Email:sudha.yasula2000@gmail.com/yasula2000@yahoo.com

ABSTRACT

Drug development based on natural p55ducts is an important and fact growing area due to the limitations of developing new synthetic medicines. such as aspirin, digoxin, morphine, quinine, pilocarpine etc., (Ansari and Inamdar, 2010 It is seen that every plant is associated with some useful properties and many of them molecules based on the principle of active components or pure chemicals. Clinical, pharmacological and chemical studies on these traditional medicines, which were derived predominantly from plants, were the basis of isolation of most early are present in our pharmacopeias. The most important use of secondary plant products has been associated with diseases. Drug development based on natural product is an important and fast growing.

Though several commercial drugs are available for cancer, they parallely have the side effects during chemotherapy. In contradictory, the herbal drugs have a very slow or passive treatment against cancer cells. Hence the idea of the present study is to formulate a commercial drug, doxorubicin with the compound isolated from the methanolic extract of *Delonix regia* flower by studying its friability of the less dosage of doxorubicin along with the compound isolated from the methanolic extract of *Delonix regia* in the tablet formulation.

Delonix regia (Boj. Ex. Hook) is a flowering plant in the pea family found in tropical areas and are used informally to treat diseases in folk medicine. Though several commercial drugs are available for cancer, they parallely have the side effects during chemotherapy. In contradictory, the herbal drugs have a very slow or passive treatment against cancer cells. Hence the idea of the present study is to formulate a commercial drug, doxorubicin with the compound isolated from the methanolic extract of *Delonix regia* flower by studying its friability in the tablet /powder formulation.This formulation was proposed to check for

Cytotoxicity against colon carcinoma cells (HCT- 116 cell line), hepatic cellular carcinoma cells (HepG-2) and breast carcinoma cells (MCF-7). This will prove the maximum efficacy of the formulation prepared amongst the three types of cell lines..

Keywords: *Delonix regia* , Compound isolation and Doxorubicin

SYMPOSIUM-IB

Current Trends in Health Care- Genetic Disorders & Communicable Diseases

SIB-OP-01

Unravelling the link between Sestrin2 and its miRNA targets in patients with type 2 diabetes without and with atherosclerosis

Anusha Rajagopal, Saravanakumar Venkatesan, Saravanakumar Sundararajan, Muthuswamy Balasubramanyam, Ranjit Mohan Anjana, Viswanathan Mohan and Nagaraj Manickam

Madras Diabetes Research Foundation & Dr. Mohan's Diabetes Specialities Centre,
WHO Collaborating Centre for Non-communicable Diseases Prevention and Control & ICMR Center for Advanced Research on Diabetes,
No. 4, Conran Smith Road, Gopalapuram, Chennai - 600086, India
Email :nagaraj@mdrf.in

ABSTRACT

Atherosclerosis plays a major role in the progression of cardiovascular diseases (CVDs) in patients with type 2 diabetes (T2D). In our earlier study, we observed decreased levels of Sestrin2 in patients with diabetes and dyslipidemia. While the recent literature attests a role for miRNAs as upstream regulators of several signaling cascades, there is paucity of information on Sestrin2 and its miRNA targets in diabetes and atherosclerosis. Therefore, our study is aimed to unravel the status of Sestrin2 and its miRNA targets in monocytes as well as in circulation in T2D patients without/with atherosclerosis.

Keywords: Sestrin2, microRNAs, atherosclerosis, Diabetes.

SIB-OP-02

Allergic people may fight SARS-CoV-2 better via cross reactive T-Cells

Hemchandra Deka, Sandipan Talukdar*, Debabrat Baishya*
Department of Bioengineering and Technology,
Gauhati University, Guwahati – 781014, Assam
Email: hem_chdekaa@yahoo.co.in

ABSTRACT

The cross reactive T cells phenomenon is a crucially important aspect of the adaptive immunity arm. During the pandemic also, plethora of evidences have been reported about cross reactive T cells providing protection against SARS-CoV-2, the pandemic virus. However, there is a gross lack in understanding how cross reactive T cells against SARS-CoV-2 as well as allergens can function in allergic people who had contracted COVID-19. We hypothesized that TCRs primed against a variety of allergens and also cross reactive to SARS-CoV-2, could induce triggering of heterologous T cell mediated immunity. With application of bioinformatics tools we identified 9 CDR3 beta amino acid sequences that were originally primed against a variety of allergens showed cross reactivity against SARS-CoV-2 epitopes as well. We also found that these CDR3 beta sequences are identical to tissue resident memory T cells present in lung. As many as 54 SARS-CoV-2 epitopes are found to have bound by these TCRs with high scores of specificity. These findings hint that allergic individuals when exposed to the pandemic virus may trigger rapid T cell mediated immunity.

Keywords: SARS-CoV-2, TRM, Cross reactive T-cells, Allergens.

SIB-OP-03

Structure-based mutation analysis of ALDH1L2 gene variant in chronic liver disease

Partha Pratim Das¹, Manash Jyoti Kalita¹, Simanta Kalita¹,
& Subhash Medhi^{1*}

¹Department of Bioengineering & Technology, Gauhati University,
Guwahati, Assam-14

Email: parthanehu21@gmail.com

ABSTRACT

Mutations in genes encoding enzymes involved in alcohol metabolism can increase the risk of liver disease. Thus, the study aimed to investigate and access the variants in alcohol metabolizing pathway genes in ALD and NAFLD patients from the northeast Indian population. For this, the cases were selected from Gauhati Medical College & Hospital, along with healthy control. The targeted re-sequencing was performed on the Illumina HiSeq platform and annotated VCF file was analyzed by wANNOVAR followed by sorting using the amino acid substitution tools for non-synonymous coding variants. The biophysical properties and protein stability prediction due to single nucleotide changes of significant SNP were analyzed, along with Molecular Dynamics (MD) simulations. The results revealed that the alcohol metabolizing pathway genes found the largest number of variants to be in the intronic region. Among all genes, the CYP gene reported the highest number of variants (977), whereas the CAT gene reported only 12 variants in all the subjects tested, while ALDH and ADH reported 346 and 110 variants, respectively. Upon recurrent assessment of variants from these genes of the alcohol metabolism pathway, one variant, i.e., ALDH1L2 gene c.337C>G, p.Pro113Ala, (rs199841702) was found to be highly significant, that belongs to the aldehyde dehydrogenase and the formyl transferase superfamily. Evaluation of the variant ALDH1L2 (rs199841702) using the functional amino acid substitution tool is predicted to be 'deleterious' and 'pathogenic'. The radius of gyration (Rg) plot suggests the change in the compactness of the protein during MD with the Rg value of the mutated structure, which appears to be a jump of 3.85nm, showing unstable behavior. The ALDH1L2 c.337C>G, p.Pro113Ala variant and genotype distribution is a novel identification that requires recurrent validation for its role in alcohol metabolism and the risk of developing alcoholic liver disease in the northeast Indian population.

Keywords: Aldehyde dehydrogenase, Alcoholic liver disease, targeted re-sequencing, SNP

Human Leukocyte Antigen HLA B-27 as a molecular marker for a genetic disease

Pranab Roy

Molecular Biology lab,
Institute of Child Health, Kolkata
Email: pranabroy@rediffmail.com

ABSTRACT

Major Histocompatibility Complex (MHC) are genetic loci on human chromosome no.6 where three distinct regions coding for class I, class II and class III MHC genes are located. Class I genes code for three alpha chains. The alpha chains combine with beta2-microglobulin to form the class I MHC molecule. The three genes in human class I region are designated HLA A, HLA B and HLA C and each of these loci have a large number of alleles. The occurrence of a particular allele depends on the individual. Other than these there are three loci named DP, DQ and DR, each encoding one alpha chain and one beta chain, which combine to form the class II MHC molecule. Whereas the class I molecules are expressed on the cell surface of almost all nucleated cells, the class II molecules are expressed on all Antigen Presenting Cells (APC). The primary role of MHC proteins is to present the processed antigenic peptides to T cell receptors for eliciting T cell mediated immunity.

There are a large number of allelic variants of the HLA genes. More than a hundred polymorphic HLA B genes coding for class I antigens are known. One of these, HLA B-27 is known to be closely associated with a genetic disease, called Ankylosing Spondylosis. There is 90% correlation with the occurrence of this disease and presence of HLA B-27 gene. So molecular diagnostics utilize this to detect disease early in life. Real Time PCR has been used for the detection of this allele HLA B-27 and we have carried out about one hundred investigations for this detection. Approximately, 10% of the cases have been positive, indicating the presence of HLA B-27 gene in those positive cases.

Keywords: HLA, molecular marker, MHC, genetic disease

SIB-OP-05

Genomic biomarkers of impaired cognition in schizophrenia

SaranyaJayapalan, Basant Kumar Tiwary
Department of Bioinformatics,
Pondicherry University, Puducherry
Email: saranya.jgs@gmail.com

ABSTRACT

Cognition is viewed as a process of acquiring knowledge through thought, perception, judgment and memory. Cognitive decline is commonly seen in schizophrenia patients which causes focal impairment to brain structures mediating cognition and leading to impaired personality and decision making. In this study, an integrated approach of text mining, GWAS, pathway analysis and functional annotation studies were employed to identify gene/miRNA biomarkers and functional SNPs to decipher the genetic mechanism of cognitive function in Schizophrenia. The study provides a mechanistic basis of the impaired brain function with respect to schizophrenia.

Keywords: Schizophrenia, Cognition, GWAS, Biomarkers, SNPs

SIB-OP-06

**Toxic and teratogenic effects of lamotrigine-an antiepileptic drugs
in *Drosophila melanogaster* paralytic mutant (BS)**

Shalini M. and B.P. Harini
Centre for Applied Genetics,
Department of Zoology,
Bangalore University,
Jnanabharathi Campus,
Bengaluru, Karnataka, India
Email: shalinimoses77@gmail.com

ABSTRACT

Toxicity and teratogenicity are considered as important side effects of the antiepileptic drugs. A study on phenotype based whole organism is model to evaluate the Developmental toxicity and teratogenicity of drugs induced in flies. *Drosophila* as a genetic model organism makes it an ideal system to use for epilepsy studies. Flies exhibit a number of interesting behaviors, including various seizure and paralytic phenotypes. These mutants have been exposed to Lamotrigine- an Antiepileptic drugs (AEDs) is the FDA approved most commonly used newer AED for treatment of bipolar I disorder. To understand the toxic and teratogenic potentials of the Lamotrigine in both *Drosophila melanogaster* (ok) and *Drosophila melanogaster* (bss), flies were reared on media supplemented with different doses of Lamotrigine to both larvae and adults. Teratogenicity was evaluated by performing a broad survey of external morphology of adults resulting after drug treatment of larvae. The dose-dependent developmental delay, reduced pupal and adult size reduced adult eclosions, minimum larval, adult mortality, significant pupal mortality was observed with incomplete pupal eclosion. The present study reveals that on exposure to Lamotrigine-an Antiepileptic drug pre-adult stages are prone to developmental toxicity than the treated adult.

Key words: *Drosophila melanogaster*, Lamotrigine, Bang sensitive (bss), teratogenicity,

SIB-OP-07

**Discovery of Ritonavir Analogues of Antiretroviral Compounds
Against SARS-CoV-2 Envelope Protein**

Shivani Negi, Umesh Yadava*
Department of Physics,
DDU Gorakhpur University,
Gorakhpur, India
*Email: u_yadava@yahoo.com

ABSTRACT

The ever-mutating nature of the SARS-CoV-2 has caused a havoc resulting into tremendous need for a potential drug to target and inhibit its mechanism to multiply within the Human body. Keeping in mind the above objective we have chosen 53 FDA approved compounds, analogous to RITONAVIR and repurposed them to undermine the disease. The top five best compounds were screened through XP precision docking module of GLIDE, implemented in Schrodinger Suite. Further, Molecular Dynamics Simulation, results vividly demonstrated that these five compounds may be developed as inhibitors of envelope protein in order to combat SARS-CoV-2.

Keywords: SARS-CoV-2, Molecular docking, Molecular Dynamics Simulation, envelope protein.

SIB-OP-08

Altered expression of TLR3 may be a risk factor for vertical transmission of Hepatitis B Virus

Simanta Kalita¹, Manash Jyoti Kalita¹ Partha Pratim Das¹, Subhash Medhi^{1*}

¹ Department of Bioengineering & Technology, Gauhati University,
Guwahati-781014 Assam

Email: simantakalitas@gmail.com

ABSTRACT

Hepatitis B virus infection is still one of major contributors to global disease burden. Toll like receptors are pattern recognition molecules involved in innate immunity in HBV which might have a role in vertical transmission of HBV. In this study we have assessed the role of altered expression of TLR3 mRNA and cord blood HbeAg as potential predictors for HBV vertical transmission. 53 Antenatal subjects were recruited in the study and HbsAg, HbeAg were detected by ELISA and TLR3 mRNA expression is performed by RT-PCR. HBV DNA is detected by nested PCR. Analysis of TLR-3 expression among the 32 HBV positive mothers with HBsAg positive cord blood showed an overall downregulation of expression in 17 cases (53.15%, 0.50 ± 0.2) which was found to be significant ($p=0.001 < 0.05$) upon comparison with the remaining 15 cases with elevated TLR-3 expression (46.8%, 2.04 ± 1.3). A generalised over all downregulation of TLR-3 expression was observed among cord blood HBeAg positive (N=4, 50%, mean: 0.55 ± 0.3) and HBV DNA positive (N=11, 52.38%, mean: 0.44 ± 0.3), which was statistically significant upon comparison with respective upregulation frequency ($p=0.018$ and $p=0.001$ respectively). Downregulation of TLR3 mRNA in peripheral blood and presence of HbeAg in cord blood may be a potential risk factor for HBV transmission to neonates.

Keywords: HBV, RT-PCR, TLR

**Diagnosis of cystic fibrosis in Indian children:
Experience of sweat chloride estimations from a single centre**

Surupa Basu^{1*}, Partha P Haldar, Pranab Roy, Apurba Ghosh¹

¹Institute of Child Health, Kolkata, India

*Email: basusurupa@gmail.com

ABSTRACT

Cystic fibrosis (CF) is an inherited disorder. Because of its varied presentation involving lungs, pancreas, and reproductive organs, it appears in the differential diagnosis of many pediatric diseases. Diagnosis of CF by consensus criteria includes identification of clinical features or positive family history and laboratory confirmation by identification of genetic mutations or positive sweat chloride results (two separate occasions). Over 1500 mutations in the CFTR gene makes molecular diagnosis difficult. In Indians, the commonest $\Delta F508$ mutation occurs in lower frequency, and also rare and novel mutations exist. Sweat chloride analysis is therefore a handy alternative tool for diagnosis. CF is not very rare as thought and is probably under-diagnosed in Indian children. In this paper, we report our experiences with sweat chloride analysis in children of the eastern region of India using a low cost indigenous method. We also explored CFTR mutations in 20 patients who were diagnosed with cystic fibrosis. Analysis was performed in infants and children (since June 2012) and rarely in symptomatic adults. Briefly, steps involve pilocarpine iontophoresis on the arms/ legs of the patient for inducing local sweat production, collection in pre-weighed filter paper (minimum 100 mg) for 30 mins, estimation of chloride by titration with mercuric chloride. The method has a sensitivity of 10 mEq/L. Values of > 60 mEq/L are likely to be diagnostic of CF. The method has side effects of inadequate collection, minor burns in a minority of patients. Precautions to prevent contamination or evaporation of sweat, prevents false positives. CFTR gene analysis was carried out in an external facility using next genome sequencing technology. 956 patients (564 male) with a median age of 4 years 4 months (range: 29d – 51 years) reported an average sweat collection of 170 ± 4 mg. Inadequate collection (164/956) and burns (20/956) were recorded. The common causes for referral were recurrent cold/ cough with respiratory distress, recurrent pneumonia, failure to thrive, pancreatitis and history of meconium ileus. 88/956 patients were diagnosed with CF (two positive sweat chloride findings). Gene analysis for CFTR mutations in 20 cases revealed that $\Delta F508$ mutation though

the most common, occurred in a low frequency in our population. There were 5 homozygous cases, while the remaining 15 were compound heterozygotes.

Availability of sweat chloride analysis serves as an invaluable tool to rule out CF. A low cost method adopted in our centre diagnoses CF in children from various socioeconomic backgrounds. This may eventually help to treat and manage CF and avoid severe malnutrition and early mortality due to delayed diagnosis. Gene analysis is an expensive alternative.

Keywords: Cystic Fibrosis, Sweat chloride, Sweat electrolytes, Pilocarpine Iontophoresis, CFTR mutations

SIB-OP-10

Comparative genomics of global *Staphylococcus aureus* strains from human and animal sources displayed the wide resistome with antibiotic resistance genes

Susweta Das^{1*}, Pinnapati Preethikishore¹, Jyothsna P.V¹, Ashika G¹,
Meha Thyagaraj¹, Nandan A Soratur¹,
Vishwanathagouda C Halemani¹,
Brinda Yadav¹.

¹Department of Biotechnology;
School of Basic & Applied Sciences;
Dayananda Sagar University,
Bangalore- 560078, Karnataka India
*Email: susweta@dsu.edu.in

ABSTRACT

Whole genome sequence-based genetic profiling of antibiotic resistance genes in *Staphylococcus aureus* pathogen affecting human and animal hosts is crucial for development of new strategies to combat the antibiotic resistant pathogen. We mined and analyzed genome of global *S. aureus* strains originating from human and animal hosts and observed putative ARGs viz., *blaZ* encoding enzymes viz., beta lactamase and *mecA* encoding transpeptidase (PBP2a) enzyme attributing to beta lactam resistance, *ant (9)-Ia*; *ant (6)-Ia*., *aph(3')-III*, *aac(6')aph(2'')* encoding different variants of aminoglycoside modifying enzymes. Comparative genome analyses of *S. aureus* genome candidates originating from the different niches (human, swine, cow, and chicken origin) exemplified high synteny and plasticity amongst the genome indicating zoonotic potential. This study detected the genetic determinant of emerging resistance conferring enzymes that needs attention for designing of suitable inhibitors which can save the antibiotics.

Keywords: *Staphylococcus aureus*, antibiotic resistance, genome

SYMPOSIUM-II

Stem Cells & Regenerative Medicine

SII-OP-01

Sestrin 2 induced muscle stem cells rejuvenation in aged animal model

Masroor Anwar, Sharmistha Dey
Department of Biophysics AIIMS New Delhi
Email: masroor_anwar07@yahoo.com

ABSTRACT

Muscle stem cells (MuSCs) attains a presenescent state with age and do not divide even upon stress or injury. We investigated the association of Sestrin2 (Sesn2) with MuSCs rejuvenation in exercised aged animal model. C57BL6 mouse model of different age group were taken. Treadmill exercise was given to the aged model group. Magnetic activated cell sorting (MACS) were done for the isolation of MuSCs. Flow cytometric validation of MuSCs were done along with quantitative analysis of Sesn2 via surface plasmon resonance (SPR) were performed. Sesn2 validation was done using western blot analysis. Our result showed a significant decline in the expression of Sesn2 in aged MuSCs which improved significantly in MuSCs of intervention group. The improved proliferation potential of MuSCs lead us to conclude that Sesn2 potentially act as a modulator in reversing the presenescent state of MuSCs in aged animal model.

Keywords: Aging, Muscle Stem cells, Sestrin2, Rejuvenation, Surface Plasmon Resonance.

ZEB1 potentiates chemoresistance in breast cancer stem cells through evading apoptosis

Surbhi Shivhare^{1, 2} and Amitava Das^{1, 2*}

¹Department of Applied Biology,
Council of Scientific & Industrial Research-Indian Institute of Chemical
Technology (CSIR-IICT), Uppal Road,
Tarnaka, Hyderabad – 500 007 TS, INDIA.

²Academy of Scientific and Innovative Research,
Ghaziabad, UP - 201 002, INDIA.

*Email: amitavadas@iict.res.in; amitavadas.iict@gov.in

ABSTRACT

Chemoresistance remains a challenge to treat breast cancer patients. Epithelial-to-mesenchymal-transition (EMT) promotes tumorigenesis and chemoresistance in breast cancer stem cells (CSC). The EMT-transcription factor, Zinc finger E-Box-binding homeobox 1 (ZEB1) depicted an increased expression in advanced-stage breast tumors. We generated breast CSC with stable *ZEB1* overexpression (CD24-/CD44^{+ZEB1OE}) and/or silencing (CD24-/CD44^{+ZEB1KD}). An increased colony formation efficiency but decreased differential expression of ABC transporters in CD24-/CD44^{+ZEB1OE} led us to evaluate the apoptosis mechanism. Concurrently, CD24-/CD44^{+ZEB1OE} depicted doxorubicin-induced higher and lower anti- and pro-apoptotic proteins, respectively in the mitochondrial and cytosolic fractions. Chemoresistant CD24-/CD44^{+ZEB1OE} cells depicted 1000-fold higher IC-50 values and signaling activation.

Keywords: Chemoresistance, breast cancer, apoptosis

SYMPOSIUM-III

New Biology

**Electronic Structure and IR assignments of some anti ZIKV
quinazoline compounds**

Akhilesh Kumar Rao, Umesh Yadava
Department of Physics,
DDU Gorakhpur University,
Gorakhpur, India
*Email: u_yadava@yahoo.com

ABSTRACT

Zika disease is caused by Zika virus (ZIKV), a mosquito-borne flavivirus. Compounds N-[4((3-Bromo-4-fluorophenyl)amino)-7-methoxyquinazolin-6-yl]-2-butyramide (**1**), N-(4-((4'-6-difluoro-[1,1'-biphenyl]-3-yl)amino)quinazolin-6-yl)-2-butyramide (**2**), N-(4((3-fluorophenyl)amino)-7-methoxyquinazolin-6-yl)but-2-ynamide (**3**) have been found to exhibit anti-ZIKV activities. In the present work, geometry optimizations of these compounds have been performed using DFT/B3LYP/6-31G** method and using optimized coordinates other electronic properties, IR assignments and thermodynamical parameters have been evaluated. It has been observed that core rings have robust conformations while side chains/groups have variations in their conformations. The rotational constant decreases as rotational temperature is increased. Small value of HOMO-LUMO gaps indicated that these molecules are chemically reactive and MEP analyses indicated that the intramolecular charge transfer can easily take place within the molecule. Normal mode infrared assignments of all the three compounds, within 400cm⁻¹ to 4000cm⁻¹ have also been carried out and compared.

Keywords: Flavivirus; DFT; HOMO-LUMO; Chemical reactivity; IR assignment; GAUSSIAN03; Density functional theory

SIII-OP-02

Isolation of mRNA for the study of root rot disease in *Coleus forskholii*

Shirangala Thimappa Girisha

Department of Biotechnology,
Jnanabharathi Campus,
Bangalore University, Bengaluru
E mail: stgirisha@gmail.com

ABSTRACT

Coleus forskholii is an important medicinal plant belonging to native to India and having significant economical values in the market due to its composition rich in phytochemical such as useful alkaloid forskholii and a diterpenoid present in the swollen primary root tissue tuber. Their components are extensively utilized in the treatment of health risks such as cardiac disease, diabetes, eczema, psoriasis, asthma and cancer. Hence due to its high economic and medicinal importance its collection of tubers being made in extensive manner leading to its listing as endangered species. On the other side the plant is also susceptible to many diseases and one of the major causes for its loss is due to its root rot disease caused by *Fusarium chlamydosporum* a fungal species, affecting the plant in different forms. The mRNAs have been isolated from plant sample (affected and wild type) by the extraction with acid guanidium thiocyanate : phenol : chloroform resulting in the pure preparation of RNA samples which were separated by electrophoresis, hence study is in progress to reveal the relation between the disease of *Coleus forskholii* and its mRNA profile.

Keywords: *Coleus forskholii*, phytochemical, root rot disease

SIII-OP-03

Preparation and characterization of biogenic silver nanoparticles using *Strobilanthes cordifolia* (Vahl) J.R.I.Wood leaves and its Biological applications

Dharamalingam Kirubakaran, Kuppusamy Selvam
Department of Botany,
School of Life Sciences,
Periyar University, Salem, Tamil Nadu, India.
Email: selsarat@yahoo.com

ABSTRACT

In the present study aqueous leaf extract of *Strobilanthes cordifolia* J.R.I.Wood was combined with silver nitrate to synthesis silver nanoparticles (AgNPs).The AgNPs was Characterized using visible spectroscopy (UV), X-ray diffraction (XRD), fourier transform infrared spectrophotometer (FTIR), scanning electron microscope (SEM), energy dispersive X-ray (EDaX), particle size analysis and transmission electron microscope (TEM).The UV spectrum absorption peak occurred at 438nm. The FTIR analysis of the AgNPs indicated the presence of functional groups such as aldehyde, alkenes and carboxylic acids.The crystalline structure of AgNPs was confirmed by XRD. The AgNPs have a spherical shape according to SEM. The AgNPs components composition was confirmed by EDaX.The particle size distribution of AgNPs is monodispersion in the range at 42.54nm.TEM demonstrated that the AgNPs size to be between 11.35-34.90 nm. The AgNPs exhibited good antibacterial against *Escherichia coli* and *Staphylococcus aureus*. The antioxidant activity of the AgNPs was represented by increased DPPH, ABTS and H₂O₂ activities. The antidiabetic activity of the AgNPs was indicated by the inhibition of α -amylase and α -glycosidase and anti-inflammatory highest albumin denaturation and HRBC membrane stabilization properties. Further, the AgNPs also significantly inhibited the MCF-7 cell lines. These results clearly suggest that the synthesized AgNPs using *S. cordifolia* leaves could have several potential biomedical applications.

Keywords: Green synthesis, Characterization, Antibacterial, Antioxidant, Anti-inflammatory, Anti-diabetic, Anti-proliferative

SIII-OP-04

Production of Iron rich Chocolate and Chikki from the dietary supplements (Plant extracts) to combat anaemia in malnutrition affected districts of Karnataka

Madhu Malleshappa¹ and Ramanan N²

^{1, 2}School of Sciences, Department of Life Sciences, Garden City University, Bengaluru
Email: madhu.malleshappa@gardencity.university

ABSTRACT

Anaemia is one of the most widespread nutritional deficiencies of blood which affect the populations of all ages throughout the world, children and adolescents being at a significantly higher risk for the condition. Medicinal plants have been a source of succour in the control of many diseases in developing countries and anaemia is no exception. Treatment of anaemia involves an iron-rich diet, iron and vitamin supplements. Iron supplements that are commercially available, if consumed too much of which can lead to circumstances like Hemochromatosis, Neurogenetic Disorders and sometimes even cancer. In this study extracts of different plants (*Moringa oleifera* Lamk. *Psidium guajava* L, *Cymbopogon ciratus*, *Trigonella foenum-graecum*) were examined for their iron content to formulate chocolate and chikki rich iron product to put forth as a solution to iron deficiency. Iron Deficiency is highly prevalent in all parts of India and using a traditional, plant based natural supplement to combat it is the need of the hour. These snacks can be made available easily either through manufacturing or can also be done by the local SHG (Self help groups), which can be a source of livelihood for them. The government strategy of removing malnutrition can be achieved by these iron supplements (snacks) and also serve as a source of income to the rural women, which results in the rural women empowerment. Since these fortification herbs are natural sources, the food supplements designed from their extracts are expected to provide a solution to the disease without causing the harmful effects of the commercial iron supplements and also alongside provide other nutritional benefits to the individual. Protocol will be standardized in the project to formulate herbal iron rich chocolate and chikki with much higher iron content and bio availability to make it available for easy use for the society.

India's rural population is around 65% and out of this 48% constitute women. They are treated badly, and they enjoy a far lower status than the men. The primary reason for this is that they are economically

dependent on the men for their survival, and this leads to far more societal issues in these under-developed areas. This research proposes a mechanism by which the rural women are involved in defeating malnutrition across India and for that they become economically independent. Today, the government spends crores of rupees on providing nutritional supplements to children to combat malnutrition and a huge chunk of this money is given to companies. This research explores the question of what if the government engages these rural women through Self-Help groups in the villages to create nutritional supplements using herbal products for the children in their villages. This would mean economic independence and localized, personalized attention to combat and defeat malnutrition. Finally the research closes with a proposal to conduct a study in parts of Karnataka to see the effect of this approach.

Keywords: Anaemia, Iron content, *Moringa oleifera*, *Psidium guajava*, *Cymbopogon ciratus* and *Trigonella foenum-graecum*

SIII-OP-05

Mining the Genome of *Pseudomonas aeruginosa* PB_AQ27 isolated from degraded land for plant growth-promoting genes.

Poonam Bhanse^{ab}, Purna Yesankar^{ab}, Anuja Maitreya^{ab}, Lal Singh^{ab},
Asifa Qureshi^{ab*}

^aEnvironmental Biotechnology and Genomics Division, National Environmental Engineering Research Institute, Nehru Marg, Nagpur 440 020, India,

^bAcademy of Scientific and Innovative Research (AcSIR), Ghaziabad-201002, India

Email: a_qureshi@neeri.res.in

ABSTRACT

A plant growth-promoting rhizobacteria *Pseudomonas aeruginosa* (PB_AQ27) (Ac. no. OM967239.1) was isolated from rhizospheric soil of *Dendrocalamus strictus* (Roxb.) Nees, dwelling on fly ash dumpsite of Koradi, Nagpur. The whole genome sequence of PB_AQ27 was analyzed and annotated through RAST annotation server (Rapid Annotation using Subsystem Technology). PB_AQ27 encodes 5654 protein-coding sequences with contigs annotated for plant growth-promoting activities such as *acdS* (ACC deaminase), *gltA*, *gltB*, *nosZ* (nitrogen fixation), *pstB*, *pstS* (phosphate solubilization), *pvdA* (siderophore production). While *czcA*, *czcB*, and *czcC* genes encoding for cobalt-zinc-cadmium resistance were also annotated. Based on this PB_AQ27 can be considered a potential candidate for microbe-assisted phytoremediation.

Keywords: Plant growth-promoting rhizobacteria, Degraded land, Phytoremediation, Bioremediation, Whole Genome Sequencing.

SIII-OP-06

Role of DNA Gyrase A C-terminal Domain in DNA wrapping during DNA replication in *Salmonellatyphi*

Punit Kaur, Ekta Sachdeva, Priyanka Sharma, Deepali Gupta, T.P. Singh, A.S. Ethayathulla

Department of Biophysics,
All India Institute of Medical Sciences, New Delhi
Email: punitkaur1@hotmail.com

ABSTRACT

DNA Gyrase, a topoisomerase, maintains the topological state of DNA in bacterial cells. It releases torsional stress during replication by introducing negative supercoils to prevent overwinding. Differences in DNA Gyrase activity and specificity are attributed to C-terminal domain of GyraseA (GyrA-CTD). Crystal structure of GyrA-CTD from *Salmonella Typhi* revealed anti-parallel beta pinwheel structure. Electro-mobility shift assay (EMSA) and fluorescent anisotropy elucidated its role in DNA wrapping. Structural and biochemical revealed key DNA binding residues. Drugs targeting DNA Gyrase QRDR region exhibit decreased efficacy due to emerging drug resistance. GyrA-CTD can be explored as new target for discovery of novel anti-bacterials.

Keywords: Anti-bacterial agents, DNA Gyrase, S. Typhi, DNA wrapping, replication, anti-bacterials

Evaluation of Free Radical Induced DNA Damage Preventive Potential and Total Phenolic and Flavonoid Content Determination of *Trachyspermum ammi* and *Myristica Fragrans*

Pushpalata Kamleshiya^{1*}, V.G. Meshram²

¹Department of Zoology, Govt. J.S.T.P.G. College, Balaghat, Madhya Pradesh, India

²P.G. Department of Biochemistry, RTM Nagpur University LIT Campus Nagpur, India

Email: kpushp99@gmail.com

ABSTRACT

Free radicals are highly reactive oxygen species generated endogenously in human body during regular metabolic process or due to exogenous xenobiotic compounds. Excess free radical production induces cellular damage thereby manifesting various neuro-degenerative disease, cardiovascular diseases, cancer and arthritis etc. Recently major studies have been increasing in medicinal plants and spices due to presence of health promoting bioactive principles viz. polyphenols and flavonoid derivatives. Scientific research has indicated a credible antioxidant potential for traditional ethnomedicinal use of spices. Thus, the present study was designed to determine free radical induced DNA damage preventive potential of *Trachyspermum ammi* and *Myristica Fragrans* commonly used in Indian cuisines. Their Total Phenolic Content (TPC) and Total Flavonoid Content (TFC) were also determined. By using the Soxhlet Extraction procedure the aqueous and 50% methanolic and 50% acetonetic extracts of *T. ammi* and *M. Fragrans* were obtained. Their antioxidant potential was evaluated by using standard methods namely Reducing power assay and DPPH [2-Diphenyl-1-picryl hydrazyl] assay and also assessed for H₂O₂ induced DNA damage by Fenton reaction. At 250 µg/ml concentration highest reducing ability of TAME (83.51%) and MFME (72.63%) were found. Similarly at the same concentration DPPH radical scavenging ability of methanolic extracts of both the spices TAME (76.29%) and MFME (69.87%) were highest when compared to standard ascorbic acid. The result shows that there is a high content of phenolic compounds in methanolic extract of both the spices *T. ammi* and *M. Fragrans*. The acetonetic extracts of spices (TAAcE and MFAcE) were rich in flavonoids. The different percent concentration (50- 250 µg/ml) of spices results in moderate to significant protection towards damage induced by Fenton reaction on calf-thymus DNA. Obtained results shows that the antioxidant activity of methanolic extracts was comparatively higher than that of its acetonetic counterpart. All the results

showing free-radical scavenging activity and DNA damage preventive property were found to be in correlation with the TPC and TFC of the sample spice extracts. Concluding that these spices should be used in development of functional food and pharmacological products because of their antioxidant and pharmaceutical property.

Keyword: Antioxidant activity, DNA damage, Phenolic content, Flavonoid content

Optimization of Biofuel Production by Molecular Characterization of Ligninase Enzyme isolated from Wood Rot Fungi in Pushpagiri and Brahmagiri Hills, Karnataka by using RAPD Molecular Markers

Santanu Das¹, B. D. Ranjitha Kumari², T. Senthil Kumar², K. M. Harinikumar³, Nandini N⁴ and A. Sellstedt⁵

¹Department of Biotechnology, Seshadripuram First Grade College, Bengaluru, India

²Department of Botany, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India

³Department of Biotechnology, University of Agricultural Sciences, GKVK, Bengaluru, India

⁴Department of Environmental Science, Bangalore University, Bengaluru

⁵Department of Plant Physiology, Umea° Plant Science Center, Umea° University, Umea°, Sweden

Email: sans_blue1@yahoo.com

ABSTRACT

Wood rot fungi are one of the major degraders in the biosphere that help in degrading most of the plant origin polymers like cellulose, hemicellulose and lignin. Lignin is the second most abundant aromatic compound found in plant cell that holds up cellulose and hemicellulose. There is a lot of emphasis that is being put on the fungal degradation of lignin using wood and other lignocellulosic as a renewable source in the production of chemicals, paper products, feeds and fuels and the use of fungi as one of the most potent sources of degrading organisms. In the present study, screening for lignin degrading enzymes were done with 132 isolates and the maximum enzyme producing strains of 10 wood rot fungi samples were taken for molecular characterization using RAPD molecular markers. Isolation of genomic DNA of the 10 wood rot fungi samples was done using phenol-chloroform method and quantified on agarose gel. The obtained genomic DNA was further subjected to characterization using RAPD-PCR method with 06 random primers OPA2, OPA5, OPA7, OPA8, OPD3 and OPC2. The amplified PCR products were analyzed by Agarose Gel Electrophoresis and was observed under UV Transilluminator. Analysis of the base pairs of the bands was done by Bio-Rad Gel Doc system. A total of 172 fragments were generated in the 10 isolates with 6 primers. Dendrogram analysis of the gels were done which gave a close relation of each DNA samples. The results indicate that some strains were genetically more similar and few diverse. The

current study shows samples 30, 40, 41, 113 and 124 are genetically closely related.

Keywords: Wood rot fungi, PCR, Ligninase enzyme, RAPD, Molecular markers

SIII-OP-09

Phycomolecule coated zinc oxide nanocatalysts as a novel nanofertilizer: Impact on plant growth characteristics, antioxidant defence mechanism and yield in soil grown shallot (*Allium ascalonicum*)

Shivakumar, M.S., **N. Priyanka**, P. Venkatachalam
Periyar University, Salem.
Email: priyaknv28@gmail.com

ABSTRACT

Nanoparticles are minute carriers which could help for efficient delivery of phycomolecules in plants for enhanced growth and yield within short duration. Seaweed is being used as a biofertilizer to increase seed germination rate as well as improved plant growth. The present study narrates the positive role of phycomolecule coated ZnONPs on plants growth improvement and yield level in shallot after 30 days of exposure. ZnONPs exposed shallot seedlings exhibited increased shoot and root growth by 1-2 times (132.50 % and 227.30%), respectively over control. Results demonstrate that the level of photosynthetic pigment contents was significantly increased for chlorophyll a 6 times (6000.90%), chlorophyll b 5 times (512.01%) and carotenoids 3 times (309.96%), respectively in ZnONPs exposed plants than the control seedlings. Interestingly, the level of antioxidative enzyme activity in shoot and root tissues was significantly enhanced by 4 times (437.85% and 415.40%); 1 times (199.22% and 162.73%); 4 times (421.53% and 434.71%) for superoxide dismutase (SOD), peroxidase (POX), catalase (CAT), respectively, and total soluble protein content was also increased in ZnONPs treated plants than the control. It is noteworthy to mention that the shallot yield as well as macro and micro nutrient contents viz., Ca, K, Na and Cu, Fe, Zn were found to be significantly much higher in ZnONPs exposed plants compared to other treatments. Results clearly suggest that phycomolecule loaded ZnONPs could be used as a novel nanofertilizer to increase crop productivity in different agricultural crops in the near future.

Keywords: Antioxidative system, Crop yield, Growth responses, Nanofertilizer, Phytonanotechnology, Zinc oxide nanoparticles

SIII-OP-10

Molecular Evolution and Phylogenetic Relationship of *Ipomoea* spp. (Convolvulaceae) based on ITS (Internal Transcribed Spacer) and Waxy Sequences

Yogesh Kharbikar, *Madhuri T. Thakre, **Anushka Deogirkar, Mokshada Balaskar, Chaitanya Bobde and Himanshu Pachare

Department of Molecular Biology and Genetic Engineering, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtra, India
Email: *madhurithakrekatre@gmail.com, **anushkadeogirkar@gmail.com

ABSTRACT

In the present investigation Internal Transcribed Spacer (ITS) sequences of nuclear ribosomal DNA and sequences for three exons and two introns of the 3' end of the nuclear gene waxy for the evaluation of sequence identity from the available taxa in the GenBank database by using the Basic Local Alignment Search Tool (BLAST). *Ipomoea* is a large and complex genus containing over 600 species of vines and shrubs widely distributed throughout the tropics and subtropics. The phylogeny of 40 species of *Ipomoea* representing the three currently recognized subgenera and nine sections within the genus was analyzed using sequences of the Internal Transcribed Spacer (ITS) region of nuclear ribosomal DNA genes and sequences for three exons and two introns of the 3' end of the Nuclear Gene Waxy. Nucleotide data from each gene or region were analyzed singly and in combination using parsimony (Phylogeny.fr). Exon and intron sequences from the relatively unexplored waxy gene provided appreciable levels of site mutations, and intron sequences revealed several phylogenetically informative deletions. ITS provided greater resolution and was largely congruent with waxy. Combined analyses using *Merremia* and *Operculina* as out-groups showed strong support for two major clades. Within the larger clade were numerous well-supported sub-clades, several of which corresponded to previously recognize taxonomic groups. ITS sequences of nuclear ribosomal DNA and sequences for three exons and two introns of the 3' end of the nuclear gene waxy are useful markers for molecular phylogenetic study of these medicinal plant species in any country.

Key words: *Ipomoea*, Internal Transcribed Spacer (ITS), Waxy gene, Basic Local Alignment Search Tool (BLAST), Molecular phylogeny.

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ABSTRACT OF
POSTER PRESENTATIONS

SYMPOSIUM-IA

Current Trends in Health Care- Oncobiology

S1A-PP-01

**Screening for Breast cancer associated factors among women of
Nagpur city, Maharashtra, India**

Damini R.Motwani¹, Rahul L.Meshram¹ and Sharda P.Bhagchandani²

¹Department of Biochemistry, DRB Sindhu Mahavidyalaya, KTR Marg,
Panchpaoli Nagpur Maharashtra

²Deptt. of Biotechnology, DRB Sindhu Mahavidyalaya, KTR Marg,
Panchpaoli Nagpur, Maharashtra

Email: daminimotwani7@gmail.com

ABSTRACT

Breast cancer is the most common female cancer worldwide including India. Breast cancer is the second most cause of death worldwide after lung cancer. Breast cancer risk factors have been examined extensively in women of more developed Asian cities/countries. In present study, we assess the knowledge, level of awareness of risk factors and screening practices especially breast self-examination (BSE) among women, considering the non-feasibility of diagnostic tools such as mammography for breast screening techniques of breast cancer in the Nagpur city, Maharashtra, India.

Keywords: Awareness, breast cancer, breast self-examination, knowledge, risk factor, screening.

S1A-PP-02

In silico* prediction and *in vitro* validation of multi-target anti-cancer property in methanolic extract of *Biancheae sappan

Kiran Kumar K M^{1*}, Kamatchi C², Kavyashree r² and Abha Bipin Patil¹

¹Department of Oncology, Yenepoya Medical College Hospital,
Deralakatte, Mangalore, Karnataka

²Department of Biotechnology, The Oxford College of Science, HSR
Layout, Bengaluru, Karnataka

* Email : kirankumar.krkm@gmail.com

ABSTRACT

Cancer is a complex disease and integrated approach needed for treatment and prevention of cancer. Medicinal plants possess anticancer properties, which is less toxic, safe and thus used as clinical drug. In our study, methanolic extract of *Biancheae sappan* screened for antioxidants properties and cytotoxic studies for A549 lung cancer cell lines. The MTT results showed inhibition in the cell growth and elevated level of LDH marker confirms cytotoxicity. This suggest bioactive compounds in the *B. Sappan*. The *in silico* analysis showed better interaction of protein receptor compared with control methotrexate. The study suggests that *B. Sappan* could serve as potential anticancer drug in the future.

Keywords: Antioxidants, MTT, LDH, A549 Cells

Biochemical monitoring of carcinoid syndrome

Pranab Kumar Sadhukhan

Tata Memorial Centre,
Department of Biochemistry,
Parel, Mumbai, India.

Email: pranab_sadhukhan@yahoo.co.in

ABSTRACT

24 hours urine 5-HIAA is a diagnostic indicator which is well recognized in case of carcinoid syndrome. The production and metabolism of serotonin and thus 5-HIAA, is dependent upon the tissue of origin of the tumor. Tumors of midgut cells, such as ileal carcinoid usually contain and release large quantities of serotonin. These amounts may not be fully reflected in the amount of 5-HIAA in urine because little is metabolized. Tumors derived from foregut cells (bronchial, pancreatic, duodenum or biliary carcinoid) produce large amounts of serotonin, which is oxidized within the tumor to 5-HIAA. Tumors produced from hindgut cells (rectal carcinoid) rarely produce excess serotonin or 5-HIAA. 24 hours urinary 5-HIAA may be ordered by itself or along with serotonin level measurement help to diagnose and monitor carcinoid tumor.

Keywords: Carcinoid tumor, 5-HIAA, Serotonin

An *In-silico* analysis of Bax Monomer competent Inhibitors for Prudent Healthy cells during Cancer Therapy

Ramesh Malothu^{1*}, Thadala Aiswarya¹, Laxminarayana Eppakayala²,
Karuna Sri Thandu³

¹Department of Biotechnology, Jawaharlal Nehru Technological University,
Kakinada, AP

²Department of Chemistry, Sreenidhi Institute of Science and Technology,
Ghatkesar, Telangana

³Department of Botany, TSR and TBK Degree and PG College,
Visakhapatnam, Andhra Pradesh
Email: ramesh_biotech@jntuk.edu.in

ABSTRACT

Cancer is a state of uncontrolled growth of abnormal cells. Discovering various strategies for cancer therapeutics is the need of the hour to understand the key inhibitors to control and completely eradicate the deadly disease. During cancer therapy, one of the major criteria apart from targeting the cancerous cells is to protect the normal healthy cells which was essentially possible by targeting the Bax monomer. Bax, also known as Bcl-2 like protein, acts as an anti-apoptotic regulator that emerges in a wide variety of cellular activities. Its site is activated through potential lead compounds that could hinder the function of the Bax pro-apoptosis activity and lead to cell death. Our current study included screening of the potential lead compounds through Qualitative Structure-Activity Relationship modeling (QSAR), Multiphase Optimization Strategy (MOST), and Molecular Docking studies. Also, notable potential inhibitors were identified from *Azadirachta Indica* and a few FDA-approved drugs. Our studies identified the prospective compounds Nimbin -5.3Kcal/mol, Meliacinin -6.3Kcal/mol, and Bamifylline -7.1kcal/mol as the lead compounds that activates Bax monomer. To further the studies, molecular dynamics simulations were performed for a better understanding of the activity and stability of the Meliacinin and Bamifylline on the Bax monomer. This study essentially can pave the way for further in-depth investigations on Nimbin, Meliacinin, and Bamifylline on their potential effect on cancer cells along with the healthy cells through *in vitro* studies and as potential hits that can also be used for further lead optimization for drug discovery against cancer.

Keywords: Bax, Nimbin, Meliacinin, Bamifylline, *Azadirachta Indica*.

Decoside: A Potential Drug against Breast Cancer

Ravikant Shekhar, H.S. Prakash and Geetha N*
Nanobiotech Lab, Department of Studies in Biotechnology,
University of Mysore, Mysuru – 570006, Karnataka
*Email: geetha@appbot.uni-mysore.ac.in

ABSTRACT

Breast cancer is developed when the cells present in the breasts start growing profusely and based on the location of the cancerous cells, its kind is determined. It is ranked at the first position among Indian females with the rate as high as 25.8 per 1,00,000 women and mortality 12.7 per 1,00,000 women. Currently, using the drugs like methotrexate, cyclophosphamide etc., are used in combinations but their side effects are very high. Some of the crucial proteins involved in the development of the tumor leading cancer are Vammin (PDBID – 1WQ8) a VEGF promoting angiogenesis, LDL receptor-related Protein 6 (LRP6) (PDBID – 4A0P) involved in the *wnt*-signalling pathway and 40s Ribosomal Protein S27a (RPS27a) (PDBID – 4Z9S), whose knocking out leads to the upregulation of p53-mediated apoptosis of the tumor cells. The present study aims to analyze the compounds with the inhibitory properties for Vammin, LRP6 and RPS27a by docking with the selected bioactive compounds from *Piper betel* vine, Mysore Variety. Further the result reveals that the Decoside was actively interacting with the proteins with the binding affinity of Vammin: -6.8; LRP6: -8.4 and RPS27a: -6.2. The ADMET studies also suggest the drug likeliness of 0.55 with a cLogP value 2.46, cLogS value -3.27, H-acceptors and donors value to be 9 and 3 respectively. Moreover, the TPSA value of Decoside showed to be 131.75 suggesting being a potential for using as a drug molecule.

Key words: Breast cancer, Vammin, LRP6, RPS27a, Molecular Docking, ADMET studies.

Novel SLN encapsulated chemotherapeutic drug regimen in the treatment of pancreatic cancer cell line

Sourabh Tiwari, Ved Prakash Bhardwaj
Govt Arts, Commerce and Science College, Sukhtawa
Email: sourabh9t@gmail.com

ABSTRACT

For treating pancreatic cancer we studied on the regimen of cisplatin and gemcitabine drugs. But these chemo drugs can also cause severe side effects. These depend on the type and dose of drugs given and how long treatment lasts. Common possible side effects include: nausea and vomiting, loss of appetite, hair loss, mouth sores, diarrhea or constipation. Chemo can also affect the blood-forming cells of the bone marrow. There are often ways to lessen these side effects such as nanomedicine, which has a great potential to treat pancreatic cancer.

The principal objective of the use of nanoparticles is the reduction in side effects that conventional treatments produce, mostly because of their non-specificity. Cancer is one of the major causes of death in the world. The major objective of this study was to assess the efficacy of a combined regimen of chemotherapeutic agents by targeting multiple pathways, thereby minimizing toxicity and other side effects.

In the current study SLN was prepared by solvent injection method and built-in with Cisplatin and Gemcitabine. In this study we evaluated the apoptotic potential of the nano-engineered formulations was investigated using cultured pancreatic adenocarcinoma cell line. Evaluation of anti-carcinogenic potential by Annexin-V-FITC/PI apoptosis assay and caspase-3 following dose dependent experiments treatment with SLN and native drugs described significant differences, creating better prospective efficacy of nano-engineered drugs. The result indicates that the SLN is a promising controlled release carrier. Nanoparticles as drug delivery systems allow exclusive approaches for cancer treatment.

Keywords: Chemotherapy, Pancreatic cancer, Nanoparticles, Nanotechnology, Solid lipid nanoparticles.

S1A-PP-07

A Study on expression of genes in various types of leukemia using *in silico* tools –a therapeutic approach

Udayadharshini S, Divya R, Ranjini B, Nirmaladevi R*

^{1,2,3}Department of Biochemistry, Biotechnology and Bioinformatics,
Avinashilingam Institute for Home Science and Higher Education for
Women, Coimbatore

*Email:nirmaladevi_bc@avinuty.ac.in udayadharshini.s@gmail.com

ABSTRACT

Leukemia is characterized by the uncontrolled proliferation of immature hematopoietic cells in the bone marrow. Analysis of differentially expressed genes (DEGs) in leukemia subtypes (AML, ALL, CML, CLL) in comparison with the non-leukemia genes helps to explore their interactions in biological pathways. The DEGs of bone marrow samples from the GEO database were identified using the GEO2R tool. The enrichment analyses were performed using STRING and GENECODIS and visualized by Cytoscape software. 718 DEGs in all leukemia types were in common with the non-leukemia genes. 847 DEGs were common among ALL, CML and CLL. About 240 DEGs were involved in pathways of hematopoietic cell lineage, p53 signalling and miRNAs in cancer. The GO analysis reveals that genes involved in transcription regulation and apoptotic pathways were modulated in ALL, CML and CLL except AML. The core genes of leukemia pathways include FLT3 of AML; PAX5, NOTCH1, TAL1 of ALL; RB1 of CML and ATM, Fas of CLL.

Keywords: Leukemia, enrichment analysis, differentially expressed genes, gene expression

S1A-PP-08

A Genomics based approach for the identification of the role of elevated expression of smooth muscle cells, fibroblast and myofibroblast specific genes in diffuse-type gastric tumor

Yajurved Narahari Selokar, G Kumaresan
Department of Genetics,
Centre for Excellance Madurai Kamaraj University,
Madurai
Email: yajurved1997@gmail.com

ABSTRACT

Gastric cancer (GC) is an aggressive gastrointestinal malignancy with high incidence and mortality rates worldwide, especially in Asia. Smooth muscle tissue is a key regulator of the pacemaker activity and plays an important role in the stomach. However, their expression in gastric cancer is still unknown. From the present study, we investigated the expression pattern of 283 muscle gene sets from molecular signature database in the gastric tumours. The expression pattern of muscle gene-sets in genome-wide tumour expression profiles from different cohorts revealed their higher expression in the diffuse subtype of tumors. Based on the overlap with the genes expressed across an array of cells from gastric tumors, the muscle genes were found to be of smooth muscle cells and fibroblast. The investigated genes were found to represent the occurrence of smooth muscle cells and myofibroblasts. Myofibroblasts are the activated fibroblasts with high expression of α -smooth muscle actin have been reported to play a critical role in cancer-associated fibroblasts and gastric cancer progression and metastasis. The investigated smooth muscle gene sets were found associated with poor survival in patients with gastric cancer

Keywords-Gastric cancer, Myofibroblasts, metastatis.

SYMPOSIUM-IB

Current Trends in Health Care- Genetic Disorders & Communicable Diseases

S1B-PP-01

Phytochemical profiling of *Thespesia populnea* leaf and fruit by GC-MS & the identification of therapeutic effects at international compound databases; A bio-in-silico study

Anitya Kumar Jain, Kalpana Verma, Pankaj Kushwaha, LK Dwivedi
Institute of Biochemistry, Department of Biotechnology, Institute of
Biomedical Sciences, Bundelkhand University Jhansi, Uttar Pradesh,
India Email: lavkush@bujhansi.ac.in

ABSTRACT

Thespesia populnea, commonly known as Paras Peepal is a large tree belongs to the family Malvaceae. It is found in tropical and coastal regions of India. The various parts of the tree are traditionally used for anti-inflammatory, hepatoprotective, anti-psoriasis, anti-diabetic, wound healing properties. The present study was carried out to identify the phytochemicals of *Thespesia populnea* in methanolic extract of leaf and fruits through TLC & GC-MS techniques. The preliminary phytochemical screening showed the presence of various phytochemicals like Glycosides, Phenol, Tannins, Flavonoids, Phytosterols, Saponins etc. In a Gas Chromatography-Mass Spectrometer examination of the said extracts, over 200 compounds were identified through Mass spectra matching with the National Institute Standard and Technology (NIST) database version 2011. Out of them, 35 compounds like Phytol, acetate, n-Hexadecanoic acid, 2H-1-Benzopyran, 6,7-dimethoxy-2,2-dimethyl-, Butylated Hydroxytoluene, Squalene, 1-(+)-Ascorbic acid 2,6-dihexadecanoate, Tetradecanoic acid, Pentadecanoic acid, Tridecanoic acid, Undecanoic acid, Palmitoleic acid, dl- α -Tocopherol, α -Tocopheryl acetate, Vitamin E, (n)- α -Tocopherol acetate, etc. were identified in 52.44% peak area of the chromatogram. Further, on cross matching of the identified compounds at international compounds databases like PUBCHEM, the tree is found to have compounds possessing antimicrobial, anti-inflammatory, antioxidant, anti-tumor, anti-inflammatory, antibacterial, antifungal, anti-viral medicinal properties. Therefore, *Thespesia populnea* can be a good source of pharmacological agents against infectious and life style disorders. Further studies may prove it a plant of great medical importance.

Keywords: Paras peepal, *Thespesia populnea*, Indian Tulip, Thin Layer Chromatography, GC-MS analysis, PubChem, Phytochemical compounds' Screening

**Investigations to develop Urine Protein Profiling of Women with
Healthy Pregnancy and Early Miscarriage**

Arti Shanware* Shweta Paranjape
Rajiv Gandhi Biotechnology Centre, LIT Campus, Nagpur
Email: s.paranjape2208@gmail.com

ABSTRACT

The recurrent spontaneous miscarriage is as high as 7.46% among Indian women while the global figure is pegged at 0.8–1.4% of all pregnancies. The miscarriage rate in India is 32%; globally it is around 10%. These are mostly found in Indian villages because of illiteracy. Miscarriage means loss refers to the unexpected loss of an unborn baby during pregnancy. It can occur for any number of reasons such as Genetic or chromosomal abnormalities, Sperm DNA fragmentation, Hormones, Obesity, Balanced translocation carrier, Abnormalities of the uterus, Antiphospholipid syndrome, Drugs and toxins etc. A miscarriage is common between 10 and 25 per cent of pregnancies before 20 weeks. To date, the USG sonography is the only method available to diagnose miscarriage but this method is expensive and not easily available in villages because it requires expertise in it. So the researchers started to study miscarriages at the molecular level and try to discover some protein markers in serum for early diagnosis of miscarriage. Even in the future, if Serum based kits are available to diagnose miscarriage risk, again may have some disadvantages of being expensive and it will not be user-friendly, also this test cannot be performed at home as it requires blood. Some researchers have reported that various Proteins, hormones, and metabolites are released during pregnancy and as urine is noninvasive as compared to other body fluids, it is considered as an ideal source of biomarker discovery. In most of the IVF centers, (β -hCG) level in the urine or serum is used as a common indicator of pregnancy.

So this research work is taken to understand various factors responsible for miscarriage as well as to study the urine protein profile of normal pregnant women and miscarriage women. In this study, we found that obesity, vaginal blood spotting, level of hCG and Progesterone are strongly linked factors to miscarriages. And in the urine protein profile, detectable variation was found in the band pattern of miscarriage and normal pregnant women as well as some specific proteins were downregulated and some proteins are up regulated in the miscarriage

samples as compared to normal pregnancy samples. These results will be helpful to discover the urine marker proteins for early diagnosis of miscarriages.

Keywords: Miscarriage, upregulated, Antiphospholipid syndrome, sonography, urine protein profile.

S1B-PP-03

Evaluation of N-sulfonylpiperidine dispiro-1, 2, 4, 5-tetraoxane analogs for their antiplasmodial activity

Bhawana Sharma, Satish Kumar Awasthi
University of Delhi, Delhi
Email:bhawanasharma10@gmail.com

ABSTRACT

The emergence of parasite resistance to the majority of available drugs, including the semi-synthetic artemisinin derivatives or an ACT, is a contemporary concern all over the world. Considering to these conditions, efforts were focused on creating novel synthetic peroxides as a potential antimalarial agent. The dispiro-1, 2, 4, 5-tetraoxanes that were investigated here, emerged as potent anti-malarial candidates and showed negligible toxicity towards mammalian cells. Compounds also exhibited potent nanomolar inhibitory activity against intra-erythrocytic asexual stages of chloroquine-resistant and chloroquine-sensitive strains of *P. falciparum* in vitro and efficacious against *P. berghei* in in vivo rodent models, produces parasite reduction ratios equivalent to artesunate.

Keywords: Plasmodium falciparum, *P. berghei*, Antimalarial drug resistance, Tetraoxanes, Endoperoxide

Antibacterial activity of *Terminalia arjuna* L. against Methicillin-Resistant *Staphylococcus aureus* from clinical isolates and their molecular genetics

Durgesh D. Wasnik & P.M. Tumane

Post Graduate Teaching Department of Microbiology,
L.I.T. Premises, Rashtrasant Tukadoji Maharaj Nagpur University,
Nagpur
Email: dwasnik75@gmail.com

ABSTRACT

The present study emphasized that antibacterial activity of *Terminalia arjuna* L. against methicillin-resistant *Staphylococcus aureus* from clinical isolates associate with hospital associated disease. *S. aureus* was isolated from different clinical samples such as urine, blood, sputum, pus/wound swab and cerebrospinal fluid (CSF). The clinical samples were collected from different pathology laboratories of Nagpur City. These samples were screened on different bacteriological media and identified on the basis of their morphological, cultural and biochemical characteristics and confirmed by 16s rRNA. During this study, 1465 different clinical samples were tested in which 1255 (85.66%) samples showed growth of bacteria. Out of 1255 clinical samples, the isolated organisms *S. aureus* was found to be 201 (17.37%). For testing with genotyping of isolates by multiplex PCR detection using *mecA*, *vanA*, OXA gene. Among the 201 isolates, 195 strains of *S. aureus* harbouring single *mecA* gene and the percentage was found to be 97.01%. 102 strains of *S. aureus* showed resistance to two genes - *mecA*+ OXA gene was found to be 50.75% whereas 74 (36.82%) strains of *S. aureus* showed resistance to three genes - *mecA* + *vanA* + OXA gene. The antibacterial activity of *Terminalia arjuna* L. were evaluated on MDR strains *S. aureus*. Antibacterial activity of five different solvent extracts (Methanol, acetone, ethanol, petroleum ether and n-Hexane) were prepared by using Soxhlet extractor. *In-vitro* antibacterial activity was performed by agar well diffusion method. The methanolic & ethanolic leaves extract to be most effective against *S. aureus* was found 22 mm & 18 mm respectively. The lowest MIC value of ethanolic leaves extract of *Terminalia arjuna* L. was found to be 6.25mg/ml. The maximum zone of inhibition of methanolic fruit extract and ethanolic fruit extract was found against *S. aureus* to be 36 mm and 30 mm respectively. Acetone fruit extract also showed good inhibitory activity against *S. aureus* (22 mm). The lowest MIC value of methanolic

fruit extract of *Terminalia arjuna* was observed against *S. aureus* (0.79 mg/ml). *Terminalia arjuna* L. fruit extract showed maximum zone of inhibition as compared to leaves against MDR strain of *S. aureus*.

Keywords: Molecular genetics, MRSA, Multiplex PCR, *Terminalia arjuna* L.

S1B-PP-05

Molecular docking of HIV-1 protease using natural and synthetic ligands

Fenza Alias¹, Sumukhi S² and Kokila S³

^{1,3}Department of Biochemistry, The Oxford College of Science, HSR Layout, Bengaluru.

²Department of Biotechnology, The Oxford College of Science, HSR Layout, Bengaluru.

Email: kokila.s1281@gmail.com

ABSTRACT

HIV-1 protease is a retroviral aspartyl protease, that is essential for the life cycle of HIV. HIV protease is responsible for processing of the gag and gag-pol polyproteins during virion maturation. It is the well-known target for developing drugs. Nelfinavir (standard) is an orally bioavailable HIV 1 protease inhibitor. We selected a total of thirty synthetic and natural molecules and compared its interaction with Nelfinavir. The synthetic ligands, Palinavir, Palmarin, Fosinopril and Semagacestat and the natural ligands, Tinosporin, Uvaol, Quercetin, Nomilin, Taxifolin, Ellagic acid, Rutin, and Bilobol displayed adequate results.

Keywords:HIV-1 protease, Autodock

S1B-PP-06

Epigenetic modulation of DDIT3 expression acts synergistically with resistance to Imatinib towards CML disease progression- A hospital based study

Gautam Hazarika¹, Manash Jyoti Kalita¹, Kalpajit Dutta¹, Simanta Kalita¹, Partha Pratim Das¹, Md Ghaznavi Idris¹, Subhash Medhi^{1*}

¹ Department of Bioengineering & Technology, Gauhati University,
Guwahati-781014 Assam
Email: hazarika.gautam31@gmail.com

ABSTRACT

Imatinib mesylate was an authentic drug aid in the treatment for CML & Philadelphia patients which is acknowledged as BCR-ABL tyrosine kinase inhibitor. DNA Methylation occupies a key role in the stability of chromosome. Changes in the methylation status of genes may impart to the advancement of Chronic Myeloid Leukemia (CML). This study reveals the role of expression analysis and methylation status of DDIT3 gene in Imatinib resistant and non-resistant cases. The Imatinib resistance was screened through RFLP method. In this case maximum number of patients were recorded in chronic phase belonging to the age group 40-59 and the accelerated and blast phase is more common in the elderly patients showing progressive nature of the disease with age. Hemoglobin and platelet counts are raised in cases where WBC count was minimum. The history of long term alcohol consumption is found to be associated with the progression of CML. The maximum level of expression of DDIT gene was recorded in chronic phase regardless of upstream (67.8%) and downstream (57.9%) regulation. DDIT showed 3.3% methylation in CML cases. In the present study notable depletion of survivality was established in the imatinib resistance patients manifesting genetic malfunction of ABL-BCR transcripts among the North East Indian inhabitants and advocating for the expansion of the disease.

Keywords: CML, Chronic Leukemia, Cytogenetics

S1B-PP-07

***In-silico* analysis of neutrophil elastase - docked using natural and synthetic ligands**

Jayashree T¹, Sumukhi S² and Kokila S³

^{1,3}Department of Biochemistry, The Oxford College of Science, HSR Layout, Bengaluru.

²Department of Biotechnology, The Oxford College of Science, HSR Layout, Bengaluru.

Email: kokila.s1281@gmail.com

ABSTRACT

Neutrophil elastase is serine protease and it has 218 amino acid residues and constitute single polypeptide chain. Neutrophil elastase causes the lungs to lose its elasticity which leads to Chronic obstructive pulmonary disease (COPD). We aim to select drug molecule against neutrophil elastase which might be used to cure COPD. We have used a total of thirty fall both natural and synthetic molecules. By the process of docking, we have compared their drug likeliness ability and the binding compared to a reference molecule. We found thirteen molecules showed drug likeliness. Out the selected natural molecules Quercetin showed best in in-silico studies.

Keywords: Human neutrophil elastase, Autodock, COPD, Quercetin.

S1B-PP-08

Screening of potent EPs of ethanolic extract of *Biancheae sappan* to the combat antimicrobial resistance

Kamatchi C^{1*}, Kiran Kumar², Kavyashree R¹, Apeksha Milind Sontakke¹

¹Department of Biotechnology, The Oxford College of Science, HSR Layout, Bengaluru, Karnataka

²Department of Oncology, Yenepoya (Deemed to be University), Mangalore, Karnataka

Email: ckamatchi@gmail.com

ABSTRACT

Resistance to fluoroquinolones in clinical isolates is mainly due to the presence of efflux pumps (EPs) which a key factor for antimicrobial resistance. In our study, we screened plant based potent phytochemicals which inhibits the EPs and use antibiotics effectively. For this observation, thirty-two isolates were collected and three isolates, showed increased in the ciprofloxacin MIC range and less accumulation of EtBr that revealed the presence of EP. From the synergistic and *in silico* analysis, the ethanolic extract of *Biancheae sappan* and ciprofloxacin, showed reduction in MIC and potent bioactive compounds that combat the EP compared to control PaβN respectively. The study suggests that the compounds present in *B. sappan* could block the efflux pump which can combat antimicrobial resistance

Keywords: AMR, EtBr, EPs, *Escherichia coli*

S1B-PP-09

Association of VDR *BsmI*, *ApaI* and *TaqI* polymorphisms with the risk of HBV related liver disease: A case control study

Manash Jyoti Kalita, Simanta Kalita, Partha Pratim Das, Subhash Medhi*
Department of Bioengineering and Technology,
Gauhati University, Guwahati, Assam
Email: mjkalita0109@rediffmail.com

ABSTRACT

Polymorphism in genes associated with Vitamin-D metabolism and its receptor molecule altogether modulates the level of active serum Vitamin-D level and as such serves as potent immune modulator. Impact of this polymorphism on outcome of HBV related liver disease is poorly understood till date. This study focus on analysing the VDR *BsmI*, *ApaI* and *TaqI* polymorphisms among HBV infected patients and its correlation with disease progression. Three hundred forty HBV infected patients belonging to three distinct clinical groups, Acute Viral hepatitis (AVH, n=205), Chronic Hepatitis (CH, n=84) and hepatocellular carcinoma (HCC, n = 51) along with 102 healthy control were included in the study. VDR polymorphism were genotyped by PCR-RFLP method followed by Sanger sequencing. Haplotype distribution was analysed using SHEsis software. Logistic regression analysis was performed to find the association between different genotype and VDR haplotype with progression of liver disease. *Apa-ICC* genotype was more frequently observed among chronic HBV patients and HCC than the acute cases among North east Indian population (OR = 2.241, C.I = 0.504- 5.558. p= 0.001). The occurrence of bAt haplotype was also found to be significantly higher among Chronic (p=0.004) and HCC (p=0.001<0.05) cases in comparison to acute cases. Further, logistic regression analysis after adjusting covariates like age, gender, serum AST/ALT level, serum albumin and platelet count, showed that *Apa-ICC* genotype and bAt haplotype were independent predictors for advancement of acute to chronic HBV infection and further.

Keywords: VDR polymorphism, Chronic HBV infection, ALT, AST, bAt haplotype, *Apa-I* CC genotype.

**Antidiabetic potential of *Gymnema latifolium*: A wet come dry lab
Research**

Natarajan, D, Shahanajismail
Periyar University
Email: drshahanajismail@gmail.com

ABSTRACT

Diabetes is the world's fastest-growing metabolic endocrine disorder. At present α -glucosidases inhibitors are considered as an effective anti-diabetic drug leads to side effects (flatulence and diarrhea). The medicine Now-a-days, molecules from plant source with having dual or multi-functions is advantageous in treating metabolic disorder like diabetes without side effects. Keeping these views, in mind, the present study aimed to identifying a lead molecule from plant source with dual biological properties such as efficient antioxidant and α -glucosidase inhibition property might be beneficial in diabetes treatments. *Gymnema latifolium* has been sequentially extracted with various solvents. The preliminary and quantitative phytochemical analysis were determined. *Gymnemalatifolium* (ethanol extract) inhibited mammalian α -glucosidase [rat intestinal maltase (IC₅₀=316 μ g/ml; K_i = 168.01 μ g/ml) in a dose-dependent manner. The Kinetic analysis revealed that GLLEE (*Gymnemalatifolium* leaf ethanol extract) inhibited α -glucosidases in a competitive mode. The bioactive compounds were identified by GCMS analysis. Molecular docking analysis revealed the interaction of active constituent such as 9-(Adamantan-1-ylhydrazono)-2,7-bis-[2-(diethylamino)-ethoxy]-fluorene, 2,2'-Bis[N-[5-diethylaminopent-2-yl]carbonyl]diphenyl disulfide and Hexaethylene glycol monododecyl ether. Docking result with the active site of human NTMGAM α -glucosidase enzyme (PDB:2QMJ). Altogether, GLLEE showed biological activities in vitro which can be used against Diabetes.

Keywords: Diabetes, α -glucosidases, *Gymnemalatifolium*, Molecular docking

S1B-PP-11

Clinical applicability of Circulating Cell-free Plasma Mitochondrial DNA as a Promising Molecular Candidate for Non-invasive Disease Diagnosis and Prognosis

Nusrath Fathima, Sandeep kumar Vishwakarma Aleem Ahmed Khan
Central Laboratory for Stem Cell Research and Translational Medicine,
Centre for Liver Research and Diagnostics, Deccan College of Medical
Sciences, Kanchanbagh, Hyderabad, Telangana, India
Email: fathima.nusrath05@gmail.com

ABSTRACT

The enormity of circulating mitochondrial DNA (cir-mtDNA) levels in different diseases has indicated need for investigating a discriminative approach for their diagnostic and prognostic implications. This study reports a new strategy to quantify plasma cir-mtDNA distinct from the nuclear DNA using a single 300 μ L of sample. Our findings revealed significantly higher levels of cir-mtDNA compared to nuclear DNA in early diagnosis of T1DM and ischemic stroke patients. Moreover, cir-mtDNA levels also predicted highly sensitive and non-invasive tool for treatment response in ischemic stroke patients in real-time. This approach may overcome sample volume issues, cost, time and efforts in downstream processes.

Keywords: Mitochondrial DNA (mtDNA); DNA extraction; DNA quantification; Diabetes, Ischemic Stroke; Prognosis and Diagnosis

S1B-PP-12

Investigations on the Effect of Fluorescein Angiography on Renal Function in Diabetic Retinopathy Patients

Pradip Hirapure¹, Shweta Paranjape² Arti Shanware³

^{1, 2} Research Scholar, Rajiv Gandhi Biotechnology Center, Laxminarayan Institute of Technology Campus, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur (India)

³ Director, Rajiv Gandhi Biotechnology Center, Laxminarayan Institute of Technology Campus, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur (India)

Email: pradiphirapure@gmail.com

ABSTRACT

Fluorescein angiography is a commonly used procedure for diagnosis and staging of diabetic retinopathy. Diabetic retinopathy is one of the major complications of type 2 Diabetes Mellitus (DM). Patients with diabetic retinopathy are likely to have chronic kidney disease (CKD) as degree of retinopathy correlates with the degree of nephropathy in diabetes. Contrast Induced Nephropathy (CIN) is now a days defined as an increase of 25% or more in serum creatinine, or an absolute increase of 0.5 mg/dl or more from baseline value, at 48-72 h following the exposure to Contrast Media (CM). Although several studies reported the effect of iodinated contrast media on kidney functions especially in diabetic CKD patients, however very few conflicting data had been published regarding fluorescein (non-iodinated dye) induced renal injury. The contradictory studies have been reported regarding the effect of fluorescein angiography on renal functions using serum creatinine, estimated GFR (eGFR), so that the current research study have been taken to investigate actual effect of fluorescein on kidney function based on the serum creatinine and early sensitive acute kidney injury biomarkers i.e. Serum Cystatin-C level in pre and post angiography samples of diabetic patients. A total of 70 diabetic patients (38 male and 32 female) met the inclusion criteria and were studied; mean age of participants were 53.1 ± 9.2 years; range 30-72 years (male, 58.3 ± 9.5 and female, 45.7 ± 9.0). Mean of Serum Creatinine before fluorescein angiography was 0.89 ± 0.20 mg/dl (male, 0.85 ± 0.20 and female, 0.89 ± 0.23), and after angiography was 0.92 ± 0.23 mg/dl (male, 0.92 ± 0.62 and female, 0.93 ± 0.22). Seven patients (20.5%) had an increase in Serum Creatinine from baseline within 72 hours of fluorescein administration (5 male and 2 female). In

the present study, no significant effect of fluorescein angiography on serum creatinine and Serum Cystatin-C level was observed.

Keywords: Fluorescein, Nephropathy, Retinopathy, Contrast Media, Creatinine, Cystatin-C

S1B-PP-13

Amino acid profile of structural proteins of severe acute respiratory syndrome Coronavirus 2

Prasanna Sanas¹, Vivek Ambade²

¹The University of Trans-Disciplinary Health Sciences and Technology
Bengaluru

²Defence Research Development Organization, Armed Forces Medical
College, Pune

Email: vivekambade@rediffmail.com

ABSTRACT

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of COVID-19, along with a RNA genome, has four structural proteins namely viz spike (S), envelope (E), membrane (M) and nucleocapsid (N) proteins. To study the amino acid profiling, the complete genome of SARS-CoV-2 isolate 2019-nCoV, WHU01, GenBank: MN988668 has been used. The S and M protein has all the 20 amino acids while N has 19 and E has 17 amino acids (Trp, His, Gln absent). The absence of cysteine in N protein indicates absence of disulphide bonds. Leucine, the essential amino acid (EAA), is the most abundant amino acid in S (8.5%), E (18.7%) and M (15.8%). Both E and M has more than 50% as EAA. The complete amino acid profile of structural proteins will help in framing the nutritional supplements during the COVID infection as all the amino acids are to be supplied by human host.

Keywords: Coronavirus, COVID-19, SARS-CoV-2, severe acute respiratory syndrome coronavirus 2. amino acid profiling

S1B-PP-14

Molecular mechanism underlying the cardio protective function of eriodictyol

Preethi Rajesh

Garden City University, Bengaluru
Email: preethi.rajesh@gardencity.university

ABSTRACT

Cardiovascular diseases are the major cause of death in women over the age of 65. The presence of endogenous estrogens protects them from atherosclerotic episodes during their reproductive ages. The study was designed to evaluate the cardio protective potential of eriodictyol on cardiac myocytes caused due to isoproterenol (ISO) induced myocardial infarction (MI) in albino wistar rats and its possible effects in the expression of molecular protein markers and signaling pathway by western blotting. Myocardial Infarction was induced by subcutaneous injection of isoproterenol, 85 mg/Kg body weight in two doses at an interval of 24 hrs after a treatment period of 45 days with eriodictyol 200mg per Kg body weight through intragastric intubation. The standard drug metoprolol succinate was administered at a dosage of 2.5mg per Kg body weight for 45 days followed by ISO induced myocardial infarction. The study showed significant increase in the levels of cardiac markers and apoptotic markers Bax, Bad, Bid, Caspase 3, Caspase 9 and PARP. The study also indicated an increase in inflammatory markers TNF α , NF $\kappa\beta$, IL 6 and C Reactive proteins in ISO induced myocardial infarction rats. The oral administration of eriodictyol showed significant changes in the level of cardiac, apoptotic and inflammatory markers with significant increase in the levels of BCL₂, Akt and HSP 70 proteins. The results indicate that the oral administration of metoprolol succinate also modulates the expression of marker proteins in ISO induced myocardial infarction in rats.

Keywords: Myocardial infarction (MI), Isoproterenol (ISO), Eriodictyol, Metoprolol succinate

S1B-PP-15

A cross-sectional community-based epidemiological study on the prevalence of *Bancroftian filariasis* and associated comorbidities across the eastern-coal field region in and around Asansol

Pritha Chakraborty, Suprabhat Mukherjee
Integrative Biochemistry & Immunology Laboratory, Department of
Animal Science,
Kazi Nazrul University, Asansol, West Bengal, India
Email: rs.pritha@knu.ac.in

ABSTRACT

Lymphatic filariasis (LF) is targeted for elimination for past two decades. It has been identified as a public health problem due to its difficulties in morbidity management. We have performed a cross-sectional community-based surveillance study to assess the prevalence of LF among the identified endemic district of Paschim Bardhaman between the period of August 2021 to August 2022. Results have shown, rare occurrence of new LF cases with higher prevalence of severe chronic lymphedema in existing LF cases. The presence of co-morbidities like diabetes have shown inversely proportional correlation supporting the beneficial roles of filarial nematodes against impaired inflammatory conditions.

Keywords: Lymphatic filariasis (LF), Lymphedema, Morbidity, Prevalence, Inflammation

S1B-PP-16

Antidiabetic effect of Flavonoid from *Rumex vesicarius* on Alloxan Induced Diabetes in Male Albino Wistar rats and its validation through *in silico* molecular docking and Dynamic simulation studies

Rakesh Davella, Estari Mamidala
Infectious Diseases Research Lab, Department of Zoology, Kakatiya
University, Warangal, Telangana State, India
Email: rakeshdavella1523@gmail.com

ABSTRACT

The leaves of *Rumex vesicarius* L. are used locally to treat diabetes, a chronic illness. A flavonoid called Luteolin from *R. vesicarius* was chosen to explore for the antidiabetic potential through the *in vivo* antidiabetic test against male albino wistar rats that had been induced with diabetes due to alloxan. Additionally, docking screening was carried out with the aid of autodock software to identify probable moiety that might be in charge of its anti-diabetic effect. Given at a dose of 100 mg/kg body weight, luteolin from *R. vesicarius* leaves had a significant ($p < 0.05$) hypoglycaemic impact after just one week. The blood glucose level significantly decreased during the third week ($p < 0.05$). All provided doses of luteolin from *R. vesicarius* leaves resulted in a reduction, however on all study days, the highest concentration (400 mg/kg body weight) produced the biggest reduction. The results of luteolin's molecular docking and dynamic modelling studies with a variety of targets revealed significant binding interactions at the active site binding pocket, with the target α -glucosidase having the highest binding affinity (-9.35 kcal/mol). In conclusion, the plant and the flavonoid luteolin it contains have potent anti-diabetic properties, possibly through an interaction with the enzyme α -glucosidase.

Keywords: Flavonoid, Luteolin, *R. vesicarius*, antidiabetic, docking, simulation.

S1B-PP-17

**To investigate multidrug resistance of Respiratory Tract Inhabiting
*Klebsiella pneumoniae***

Rashmi Kale¹& Archana Moon²
PGTD Biochemistry, RTMNU, Nagpur.
Email: moon.archana@gmail.com

ABSTRACT

Klebsiella pneumoniae is a gram-negative, encapsulated, non-motile bacterium found in the environment and has been associated with patients suffering from pneumonia. The bacterium typically colonizes human mucosal surfaces of the oropharynx and gastrointestinal (GI) tract. Fifty clinical isolates from sputum samples were collected from different hospitals (GMC, IGMC, Lata Mangeshkar hospital etc) in Nagpur, from patients suffering from respiratory tract infections. Out of 50, only 21 isolates were confirmed as *Klebsiella pneumoniae* by performing morphological and biochemical testing. An antibiotic Sensitivity test was performed to find out the multiple drug resistance patterns in the collected isolates. After analysis of the antibiotic resistant pattern, it was observed that maximum number of isolates i.e. 11 out of 21 isolates showed a resistance against Levofloxacin, Co-Trimoxazole, & Nitrofurantoin antibiotics. Very few i.e. 1 or 2 isolates showed resistant against Augmentine, Cefazolin, Doxycyclin Hydrochloride, & Cefoxitin. From this we can conclude that multiple drug resistance is observed for *Klebsiella pneumoniae* in First generation (Cefazolin), Second generation (Doxycyclin Hydrochloride, & Cefoxitin) and third generation (Augmentine) antibiotics. This paper focuses on the epidemiology of endemic opportunistic, epidemic antibiotic-resistant, and emerging hypervirulent strains of *K. pneumoniae*.

Keywords: *Klebsiella pneumoniae*, Multiple Drug Resistance, Respiratory Tract Infections, Antibiotic Sensitivity test.

S1B-PP-18

The mechanistic role of Inter-Alpha Trypsin Inhibitor Heavy Chain 4 protein in Rheumatoid Arthritis

Sagarika Biswas, **Lovely Joshi**, Ashish Sarkar, Debolina Chakraborty

¹Council of Industrial Research (CSIR)-Institute of Genomics &

Integrative Biology, Mall Road, Delhi University Campus, Delhi, India

²Academy of Scientific and Innovative Research (AcSIR), Ghaziabad, India

Email: lovelyabhilasha98@gmail.com

ABSTRACT

Rheumatoid Arthritis (RA) is an inflammatory disorder primarily affecting the joints leading to cartilage destruction. Immune cells (Lymphocytes, Monocytes/Macrophages) play a major role in managing RA progression involving differential regulation of protein expressions contributing towards disease pathogenesis. Inter-alpha-trypsin inhibitor heavy chain 4 (ITIH4), is a major protein regulating immunity and inflammation, but in RA, its significance is still unclear. Therefore, to assess mechanistic role of ITIH4, western blot analysis was carried out in RA and healthy control peripheral blood mononuclear cells (PBMCs, n=4) and the expression of ITIH4 was analyzed which was found to be significantly downregulated (p-value= 0.0294).

Keywords: Inflammation, Pathogenesis, ITIH4, Immune cells

S1B-PP-19

The role of TNF-alpha in modulating mitochondrial respiratory potential in Rheumatoid arthritis

Sagarika Biswas, **Swati Malik**, Debolina Chakraborty

¹Department of Integrative and Functional biology, CSIR- Institute of Genomics & Integrative Biology

²AcSIR- Academy of Scientific and Innovative Research

Email: swatimalik5577@gmail.com

ABSTRACT

Rheumatoid arthritis (RA) is a disorder affecting synovial joints. Mitochondrial dysfunction is associated to synovial cell abnormalities in the form decreased respiration. Here, the role of Tumor necrosis factor alpha (TNF α) in SW982 cells was analyzed. TNF α induction at different time intervals was given. The expression of NDUFS3, UQCRB1 and ATP5O was analyzed. The expression of proinflammatory markers IL6 and IL1 β was analyzed for inflammation development. Cells shows downregulation of genes at 24 hours of induction. IL6 and IL1 β depicted increased expression at 24 hours. The study analyzed the potential role of TNF α in effecting mitochondrial respiratory potential of synovial fibroblast.

Keywords: Rheumatoid arthritis, Mitochondria, TNF α , respiration, synovium, fibroblast

Characterization and antifungal susceptibility pattern of Candida isolates in Blood Stream Infection.

Shivangi Tripathi, Gopa Banerjee, Aisha Kamal, Anil Kumar Tripathi
Department of Microbiology, King George's Medical University)and
Department of Biosciences, Integral University, Lucknow (UP), India
Department of Clinical Hematology, King George's Medical University,
Lucknow (UP), India
Email: shivangikgm4@gmail.com

ABSTRACT

Candidemia is caused by Candida species which has become a common cause of fungal infection in bloodstream infection throughout the world. Incidence of opportunistic fungal infection increased presently especially in critically ill patients. Identification of accurate Candida species and emergence of drug resistant pattern causes delayed specific antifungal treatment significantly increases mortality in hospitalized patients. The prospective observational study was conducted from September 2021-August 2022 at Department of Microbiology, King George's Medical University, Lucknow. During this period we had received 237 Candida isolates from blood samples in laboratory. These patients with the history of febrile neutropenia or undergo chemotherapy or persisting neutropenic fever in spite of administration of broad spectrum antibiotics more than five days. Blood culture method was used for identification of Candida species. The speciation was done by conventional and automated methods including microscopy, germ tube test for candida albican, morphology on CHROMagar (Color production), Corn Meal Agar (Microscopic morphology) and confirm by MALDI-TOF MS respectively. After confirmation of Candida Species Antifungal susceptibility was performed by Broth micro dilution method according to CLSI M 38-A2 guideline. Blood culture was positive for Candida parapsilosis (62), Candida utilis (37), Candida tropicalis (62), Candida auris (25), Candida krusei (2), Candida albican (32), Candida glabrata (12) and Candida rugosa (1), Candida guilliermondii (1) Candida lusitaniae (01), Kodamaeaohmeri (01), Candida orthopsilosis (01). Candida tropicalis and Candida parapsilosis was most prevalent species followed by Candida utilis, and Candida albican. Maldi- TOF is a robust techniques to identify Candida species more accurately. Higher MIC was observed against Fluconazole followed by Voriconazole. Candida auris was found to be more resistant against Amphotericin B and Fluconazole. This study highlights the isolation and identification of Candida albican as well non

candida albican. This study helps to clinician to treat patients, and antifungal susceptibility pattern permitting the detection of most of the pathogenic fungal species to minimize the morbidity and mortality in Tertiary Care Unit patients.

Keywords: Candida, Diagnosis, Blood Stream Infection, Antifungal susceptibility Test.

S1B-PP-21

Computational investigation of antiretroviral SARS-CoV-2 envelope inhibitor

Shivani Negi, Umesh Yadava
Deen Dayal Upadhyay Gorakhpur University Gorakhpur
Email: shivaninegi071995@gmail.com

ABSTRACT

The ever-mutating nature of the SARS-CoV-2 has caused a havoc resulting into tremendous need for a potential drug to target and inhibit its mechanism to multiply within the Human body. Keeping in mind the above objective we have chosen 53 FDA approved compounds, analogous to RITONAVIR and repurposed them to undermine the disease. The top five best compounds were screened through XP precision docking module of GLIDE, implemented in Schrodinger Suite. Further, Molecular Dynamics Simulation, results vividly demonstrated that these five compounds may be developed as inhibitors of envelope protein in order to combat SARS-COV-2.

Keywords: SARS-COV-2, molecular docking, molecular dynamics simulations, Ritonavir

S1B-PP-22

Compounds of *Withania somnifera* (Aswagandha) as a promising potential inhibitor of structural proteins of SARS-CoV-2: An Antiviral Analysis

Swati Srivastava, Mohammad Haneef

Department of Biosciences, Integral University, U.P. Lucknow,
Department of Bioengineering, Integral University, U.P. Lucknow
Email: swatisri@student.iul.ac.in

ABSTRACT

SARS-CoV-2 and their variants of concerns a major public health issue, as they are highly mutated, resulting in new strains emerging with high pathogenicity. Now-a-days, the world is facing complicated health problem from the newly mutated severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The overwhelming outbreak of SARS-CoV-2 continues to clarify all over the world, urging scientists/academician to put an end to this global pandemic through biological bioactive compounds interventions. Presently, there is no specific treatment option that is effectively capable of COVID-19 pandemic control/eradication, so several repurposed drugs and newly conditionally approved vaccines are in use and heavily applied to control the COVID-19 pandemic. Herein, we discuss the potential therapeutic targets of structural proteins of SARS-CoV-2 and newly searched bioactive compounds of *Withania somnifera* (Aswagandha) as a promising potential inhibitor of structural proteins of SARS-CoV-2, highlighting the impact of virus multiplication inhibition.

Keywords: Bioactive compounds, SARS-CoV-2, Structural protein, Inhibitor, Aswagandha Docking.

Two new sterols from *Erythroxylum monogynum* and their *in vitro* potential activity on glucose metabolism and cytotoxicity

Usha Sree, Syeda Malaika Bhanu, N. Avanthi Reddy, S. Ravi Kiran
Department of Botany and Food & Nutrition, R.B.V.R.R. Women's
College,
Narayanaguda, Hyderabad, Telangana, India
Email: srksuripeddi@gmail.com

ABSTRACT

The aim of this study was to screen extracts from the leaves and stems of *Erythroxylum monogynum* for *in vitro* Antidiabetic activity by assessing Glucose Utilization using HepG2 cells and L6 Myoblasts, Lipid accumulation in 3T3-L1 Preadipocytes, secretion of insulin especially in INS-1 cells and INS-1 Proliferation Assay. The MTT assay for the cytotoxic studies *in vitro* of isolated sterols on HepG2 cells at varied concentrations from 0-200µg/ml revealed that all the tested extracts and compounds displayed low level of toxicity at all concentrations in a dose-dependent approach. The isolated sterols exhibited considerable increase in the uptake of glucose in HepG2 cells at both the tested concentration (dose dependent behavior) compared to control (untreated) and berberine, but not with reference drug, metformin. The toxicity assays were performed and it reveals that the sterols offered a safety profile to the cells where at 25 and 100µg/ml were also not toxic and demonstrated <10% cell death. The 4-methyl ergosta-7, 23-dien-3β-ol and 4-methyl ergosta-7, 24 (28)-dien-3β-ol showed marked increase in TG accumulation of 127% and 125% at 50 µg/ml when compared to the untreated control (100%) but less than the Rosiglitazone (145%). Studies on glucose metabolism clearly suggest that no substantial increase in the glucose metabolism of INS-1 cells was observed with both the sterols with respect to the untreated control. INS-1 proliferation studies indicate that significant increase in the total cells (108-114%) with comparative to the untreated control ($p < 0.05$) was observed.

Keywords: *Erythroxylum monogynum*, sterols, cytotoxic assay, Glucose metabolism, HepG2 cells, L6 Myoblasts and 3T3-L1 Preadipocytes

S1B-PP-24

Adenovirus type 5 RBD in SARS-CoV2 Vaccine and Neurological Complications

Vaishnav Anurag

Government Medical College,
Chandrapur, M.S., India
Email: anuragv77@gmail.com

ABSTRACT

The Covid 19 outbreak has posed a serious threat to human health worldwide and has called for a joint effort by various organizations, public health agencies, institutions and governments all over the world to develop safe and effective drugs and vaccines against this virus. However, in this race against time to develop effective drugs and vaccines, thorough evaluation of safety of these agents must not be overlooked. Many developmental vaccines are using different components to generate immune responses like inactivated SARS-CoV2, mRNA, Recombinant adenovirus type 5 vector, DNA Plasmid by electroporation, etc. One such potential vaccine uses Adenovirus type 5 RBD (Receptor Binding Domain) as an antigen in SARS-CoV2 vaccine to generate antibodies in an individual. However, the natural affinity of Adenovirus type 5 RBD to ACE2 (Angiotensin Converting Enzyme) receptors in Dorsal Root Ganglion (DRG) of spinal cord increases the risk of development of neurological complications.

Keywords: Adenovirus type 5 RBD, ACE 2 Receptor, Dorsal Root Ganglion, SARS-CoV2, Transverse Myelitis, Vaccine

SYMPOSIUM-III

New Biology

SIII-PP-01

**Phytochemical screening of aqueous and methanolic extract of
Mentha piperita growing in Bundelkhand Region**

Aditi Goswami, Sidhanshu Kumar, Smrati Sharma, Ramesh Kumar*
Department of Biochemistry,
Bundelkhand University, Jhansi-284128
*Email: drramesh.kumar34@gmail.com

ABSTRACT

Mentha piperita commonly known as mint which belongs to the family Lamiaceae. It has many uses as in toothpaste, mouthwash, breath mints, food, drinks, tea, hair rinse, facial astringent, mintbath, ease sunburn pain, bug repellent, scent up a space, etc. Further, it has many biological activities viz. anti-inflammatory, immunodulatory, anti-viral, anti-tumor, neuroprotective effect, anti-fatigue, anti-oxidant activity, etc. Keeping in view of the above beneficial effects, we sought to analyze the phytochemicals present in the aqueous as well as in the methanolic extract of *Mentha piperita* leaves. Further, the antioxidant activity was also evaluated. We collected *Mentha piperita* leaves from Jhansi district (Located in Bundelkhand Region) and washed with tap water followed by distilled water. After drying the mint leaves at room temperature, it was crushed and was used for aqueous and methanolic extractions using Soxhlet apparatus. Phytochemical analysis of the leaves of *Mentha piperita* had most of the important phytoconstituents like Alkaloids, Flavonoids, Carbohydrates, Cardiac glycosides, Tannin and Phenolic compounds, Protein and amino acids, Saponins, Glycosides, Steroids, Terpenoids, Reducing sugars are present in the aqueous and methanolic extract of mint leaves. Moreover, we observe the antioxidant activities in mint leaves which are dose dependent. We conclude that most of the secondary metabolites are present in both aqueous and methanolic extract of *Mentha piperita* leaves. However, methanolic extraction is superior to aqueous extraction for the study of phytochemical constituents.

Keywords: *Mentha piperita*, Phytochemicals, Secondary metabolites, Antioxidant Potential,

Conformational studies on d(CGGCGGCCGC)₄ four way DNA junction at various pH values

Akanksha Singh, Umesh Yadava*
Department of Physics,
Deen Dayal Upadhyaya Gorakhpur University,
Gorakhpur, 273009 India
*Email: u_yadava@yahoo.com

ABSTRACT

Designing treatments may be aimed towards deciphering the dynamics and structure of different higher-order DNA structures, such as those in branched form. Employing large interval molecular dynamics simulations and a variety of synthetic physiological circumstances, we present here the inherently dynamic and folded transformations of a unique DNA junction with the sequence d(CGGCGGCCGC)₄ that self-assembles into a 4-way junction structure of DNA with sticky ends. Using the DESMOND software and the OPLS-2005 force field, the actual crystalline coordinates (PDB ID: 3Q5C) for the chosen junction of DNA were taken into account for a period of 800 ns of MD simulation duration. This work has led to the conclusion that DNA junction periodic configurations can readily be produced and modified for a variety of functions, including genetic biomarker, Biosensors, Nano-technology, DNA Zippers, etc.

Keywords: DNA junction; Molecular simulation; Conformation; pH dependence of DNA junction

**Myco synthesis of silver nano particles using two fungal species
Gliocladium roseum & *Penicillium multicolor* and its antimicrobial
efficacy against selected pathogens**

Amrita Dinesh

Department of Biosciences,
amamruMES college Marampally
Email: gudiamritha3636@gmail.com

ABSTRACT

Nanoparticles synthesis via physico-chemical methods requires use of hazardous chemicals and many sophisticated techniques which are not easy as well as economically feasible. Whereas nanoparticles biosynthesis by microorganisms is quick, minimal time consuming and provides satisfactory biosynthesis and the whole process is very cheap and effective. The present study dealt with the ability of fungal biocontrol species namely *Gliocladium roseum* and *Penicillium multicolor* to synthesis silver nano particles and their antimicrobial efficacy. Characterisation of the nano particle synthesised by various analytical methods such as UV-vis spectrophotometry, FT-IR and TEM resulted the synthesised nanoparticles by both the fungal extracts namely culture filtrate and mycelia mat in the range of 350-450nm possessing strong N-H bonding and spherical shape. Antimicrobial activity of silver nano particle showed efficient inhibitory activity against two bacteria- *Salmonella typhi*, *Klebsiella pneumonia* and two plant foliar pathogenic fungi- *Alternaria alternata* and *Cladosporium cladosporioides*. With the application point of view, nanoparticles due to small size are easily permeable through cell membrane hence can be applied in various treatments, preparation of suitable pharmaceutical formulation as well as studies on different biological activities. The present study emphasised in the green synthesis of silver nano particle with the application of fungi and can be strengthened in future studies.

Key words : Silver NP, Bacterial NP ,Fungal NP.

Effects of *Terminalia catappa* extract in normal and diabetic animal models

Anandika Suryavanshi^{1*}, A.M. Saxena², K.G. Bajpai³

^{1,2} Department of Zoology, University of Lucknow, Lucknow

³Shia PG College, Lucknow, Uttar Pradesh

Email: anandika02@gmail.com

ABSTRACT

The effect of ethanolic extracts of *Terminalia catappa* Linn. were investigated in different animal models like fasting, fed, glucose loaded and streptozotocin (STZ) induced diabetic rats. The extract of *Terminalia catappa* with the dose of 250 mg/kg body weight was found to lower the blood glucose in normal rats significantly till 4th hour of plant extract administration. The *Terminalia catappa* extracts decreased the glucose level even after the oral administration of glucose solution in glucose loaded model. In STZ induced diabetic animals, decline in the glucose level was observed significantly.

Our study indicates that the ethanolic extract of *T. catappa* is rich in phytoconstituents and exhibited hypoglycaemic activity both in normal as well as streptozotocin-induced diabetic rats. The histopathological analysis of pancreas reveals the degranulation in beta cells of islets of Langerhans in treated models suggesting that the extract stimulates beta cells to release more insulin from the pancreas which helps in regulation of blood glucose in different types of animal models.

Keywords: Plant extracts, Streptozotocin-induced diabetic rats, hypoglycaemic, histopathology.

SIII-PP-05

**Screening of Toxicity using Food Additives in the model organism
*Caenorhabditis elegans***

Anitha Josephine.S, Monisha.R, Mothi.G, Sankaralingam.M, Elangovan.
N*and Kavitha.R*

Molecular Pharmacology Laboratory,
Department of Biotechnology,
School of Biosciences,
Periyar University,
Salem - 636 011, Tamil Nadu, India.
Email: erokavi_vasu@yahoo.com

ABSTRACT

Over, last few years the usage of synthetic food additives has been increased drastically for necessity and attractiveness upon the food products. The compounds that are present may harm our body, our study is based on observing the levels of toxicity that is determined by using the *Caenorhabditis elegans* (N2) as a model organism. We used different concentration of food additives on *C. elegans* and by performing certain assays such as life span assay, movement assay and pharyngeal assay on a time interval (15 mins). Finally, the level of toxicity of the food additives were noted and thus experiments (assays) show that the food colors that are used have shown the toxicity. But, higher level of toxicity was observed at varying concentrations of the food additives that are Red – erythrosine consecutively Green - tartrazine, lower level of toxicity was observed in Blue – brilliant blue and then at purple - brilliant blue. The study concludes that the usage of synthetic food colors must be reduced and instead, natural food additives can be used which may not affect our body system.

Keywords: Synthetic food additives, *Caenorhabditis elegans*, Toxicity.

SIII-PP-06

Metagenomic Analysis of Earthworm Gut Microbiota to Reveal their Potential of Bioremediation Process

Anupam Kumar, Shweta Yadav
Department of Zoology,
Dr. Harisingh Gour Vishwavidyalaya (A Central University)
Sagar, Madhya Pradesh
Email: anupamv1995@gmail.com

ABSTRACT

Metagenomic analysis has become popular for examining microbiome communities. Microbiota of earthworms were examined considering them as major group of the soil biomass and their ability to clean up agrochemicals. All the vital functions of earthworms are performed with assistance of different anaerobic facultative bacteria that serve as a link between the host earthworm's gut and the surrounding terrestrial environment. The study provides an overview of the metagenomic analysis of the earthworm microbiota and environment to evaluate the community structure and gene pools. In order to determine their potential for biotechnological application, the gene sets involved in the breakdown of agrochemicals were investigated.

Keywords: Anaerobic bacteria, Crop productivity, Metagenomic analysis, Pedogenesis, Redundancy.

SIII-PP-07

***Entamoeba histolytica* undergoes Apoptosis-inducing factor-mediated apoptosis-like cell death under stresses**

Anwasha Bandyopadhyay, Sudip Kumar Ghosh
Indian Institute of Technology Kharagpur, India
Email: oli.anwasha@gmail.com

ABSTRACT

Apoptosis is a well-orchestrated phenomenon in multicellular organisms that was believed to be evolved for removal of aged, infected or rogue cells from the system to ultimately ensure the well-being of the organism health. Amongst many types of PCD reported till date, the caspase-dependent and independent pathways are the most-predominant. Apoptosis-inducing factor (AIF) is potent to execute apoptosis in a caspase-independent manner. Our study reports the presence of a putative AIF in *Entamoeba histolytica* that migrates to the nucleus on receiving stresses following binding with DNA with subsequent DNA degradation. Down-regulating the EhAIF expression increases survival potency of the trophozoites.

Keywords: Apoptosis, Apoptosis-inducing factor, *Entamoeba*

Influence of 'Shodhana' process on metal ions for Ashwagandha

Aparnapreethi Rajendran, Krishnapriya Santhanu, Kanimozhi
Natarajan,
Kalaiselvi Senthil*

Department of Biochemistry,
Biotechnology and Bioinformatics.
Avinashilingam Institute for Home Science and Higher Education for
Women, Coimbatore

E-mail: kalaiselvi_bc@avinuty.ac.in, aparnaraj2599@gmail.com

ABSTRACT

Active constituents of many plant drugs may exert severe toxic effect at high concentrations.

Ashwagandha is very revered herb of Indian Ayurvedic system used specifically for various kindsof disease processes especially as nervine tonic. The classical texts referred a purification processfor Ashwagandha roots using milk (*Shodhana*). In Ayurveda, milk is considered as carrier(*Anupana*) which has been effectively used to deliver phytochemicals for targeted health benefits. The boiling of milk involves purification and reduction in the levels of toxic constituents. In thisstudy we evaluated the metal ion fingerprinting using ICP-MS after the milk treatment. Resultsemphasized that the essential metals like phosphorous, potassium, calcium, and zinc significantlyhigher after milk treatment and a two-fold increase of essential metal ions was observed in fieldroots and in field shoots the Mg concentration was found to be decreased.

Keywords: *Withania somnifera*, Shodhana, ICP-MS, Heavy Metals

SIII-PP-09

Polymorphisms in HLA-DQ and IL13 genes in shrimp allergy among West Bengal population, India

Arghya Laha, Sanjoy Podder
Department of Zoology,
The University of Burdwan,
Bardhaman-713104, West Bengal
Email: arghyalaha92@gmail.com

ABSTRACT

Genetic association of shrimp allergy in India is unexplored. In present study, HLA-DQ rs9275596, IL13 rs20541 and rs1800925 polymorphisms were genotyped in 113 allergic, 160 sensitive and 125 control subjects from West Bengal. Frequencies of risk genotypes i.e. HLA-DQ rs9275596CC, IL13 rs20541AA and rs1800925TT found higher in allergic patients than controls ($P < 0.05$). Distribution of genotypes showed significant difference between younger (20-40years) and older (>40years) allergic patients ($P = 0.006$). IL13 TA haplotype found to be associated with shrimp allergy and elevated IgE ($P = 0.02$). The present study builds knowledge about genetic causes of shrimp allergy that will help in target-specific therapeutics in future.

Keywords: HLA-DQ, IL13, Shrimp-specific IgE, Shrimp challenge, SNP

Screening and genomic characterization of fungi for nondigestible oligosaccharides production

Atul Chavan^{1,2}, Anshuman Khardenavis^{1,2}

¹ Environmental Biotechnology and Genomics Division, CSIR-National Environmental Engineering Research Institute, Nehru Marg, Nagpur 440020, India

² Academy of Scientific and Innovative Research (AcSIR), Ghaziabad 201002, India

Email: atulrc1994@gmail.com

ABSTRACT

The isolated fungal strains HKF74 exhibited the highest extracellular hydrolytic activity amongst the different fungal isolates screened and sequenced using illumina sequencing, followed by de novo assembly of high-throughput sequencing reads, and functional gene annotation using GeneMark-ES, BLAST, CAZy, and other databases. Gene/enzymes related to oligosaccharide synthesis mined in the genome of fungi and in silico characterization of these genes performed using various bioinformatics tools.

The focus of this research is to investigate a fungal screening that uses sugars as a carbon source and focuses on the generation of fructofuranosidase, galactosidase, mannosidase, xylanases, and the production of its respective prebiotics. The enzymes from the most promising cultures were tested in an enzymatic procedure to produce various prebiotics.

Keywords: Prebiotics, Probiotics, Genomics, CAZyme, Fungal genome

SIII-PP-11

Impact of methanol on mitochondrial DNA replication in Zebrafish ovarian follicle

Bhavani Biral, Sharyu M Jankar, Emma Spikings and Aishwarya S*
SBRR Mahajana First Grade College Mysuru
LIRANS Institute of Research in the Applied Natural Sciences,
University of Bedfordshire,
Luton, United Kingdom
Email: aishwaryas.fgc@mahajana.edu.in

ABSTRACT

The cryopreservation of ovaries is becoming important in treating infertility in females. Therefore, the use of cryoprotectants which can cause least damage to the cells during cryopreservation becomes necessary. The study here involves the treatment of zebrafish ovarian follicles with methanol which is said to be the least toxic. The 3rd and 4th stage ovarian follicles have been selected as the maternal DNA undergoes transcription and replication at these stages. The effect of different concentrations of methanol on the genes (PoLGA, PoLGB and TFAM) responsible for transcription and replication of mtDNA has been analysed using Real Time PCR. The expression levels of the target genes were compared with the housekeeping genes β -Actin and EF1- α . Statistical analysis showed that there was significant difference with the 3rd and 4th stages samples treated with 2 molar and 4 molar methanol for the genes TFAM and PoLGB indicating that higher concentrations of methanol over 1M may lead to a decrease in the expression levels of the genes.

Keywords: Mitochondrial DNA, Zebrafish

**Therapeutic potential of Lichens from Similipal Biosphere Reserve,
India**

Bijayananda Sahoo and Biswajit Rath*
Department of Biotechnology,
Maharaja Sriram Chandra Bhanja Deo University
Baripada-757003, Odisha, India
Email: bsahoo41293@gmail.com

ABSTRACT

Lichens are unique organisms and reservoirs of specific chemical compounds rarely found in other natural sources. Different solvents (Methanol, Acetone, Ethanol and Benzene) extracts of lichens, *Lecanora thysanophora* and *Cryptothecia striata*, collected from Similipal Biosphere Reserve (Odisha, India) were studied for their phytochemical, antioxidant and antimicrobial activity. Experimental results proved that both species were promising and possess many interesting phytoconstituents with potential bioactivity though relatively *L. thysanophora* was found to have better activity than *C. striata*. Subsequent study on isolating and purifying the novel compounds from such lichens will lead to their potential therapeutic applications in the future.

Keywords: Antimicrobial, antioxidant, lichen, phytochemicals, solvent

Micropropagation and extraction of para-methoxycinnamate and Kaempferol from suspension cultures of *Kaempferia rotunda* linn.

Bosco Lawrence

Department of Botany,
Government College for Women,
Thiruvananthapuram
Email: boscotvm@gmail.com

ABSTRACT

Kaempferia rotunda Linn. belonging to the family Zingiberaceae is an aromatic herb widely used as a local application for tumours, swellings and wounds. The major component of *Kaempferia rotunda* are Kaempferol and para methoxy cinnamate. In Ayurveda, the improvement formulations using the herb are *Chyavanaprasam*, *Asokarishtam*, *Baladhatryaditailam*, *Kalyanakaghritam*, etc. The drug "HALLAKAM" prepared from this is in popular use in the form of powder or as an ointment application to wounds and bruises to reduce swellings. Kaempferol reduces the incidence of brain vascular diseases in humans. In addition, kaempferol prevents and reduces the effects of atherosclerosis by reducing vascular inflammation, thrombus formation, and oxidation of low-density lipoproteins. Kaempferol induces apoptosis, mitochondrial dysfunction, and nuclear condensation in various cancer cell lines through the decrease of oxidative stress, and possibly due to an antiangiogenic effect. The present study was aimed at the induction of somatic embryos through indirect organogenesis and extraction of para-methoxycinnamate and kaempferol from cell suspension cultures. Protocols were standardized for Callus induction and somatic Embryogenesis. Callus obtained from 2, 4-D containing cultures were white, friable and non organogenic. In suspension the cells produced para-methoxycinnamate and kaempferol in the presence of low concentrations of sugar in complete darkness. Indirect organogenesis obtained in cultures of callus containing various combinations of NAA and BA. Caulogenesis was observed in higher concentrations of BA and rhizogenesis was noticed in higher concentrations of NAA. Amongst various hormonal combinations used, MS medium supplemented with 1.5mg/l BAP and 1.5 mg/l 2,4-D resulted in the best callus induction. In 3.0 mg/l BAP and 1.5-3.0mg/l 2,4-D numerous small somatic embryos with smooth surface could be seen developing on the surface of embryogenic callus. Although the protocol was successful in inducing somatic embryos, continuous

supplementation with 2, 4-D and BA was essential for the proliferation of the somatic embryos and not less than forty percentage of the embryos were aborted in the early stages of development. *In vitro* raised plantlets were rooted in IBA containing medium. Primary hardening of *in vitro* raised plantlets was achieved in sterile vermiculate nutrified with Hoagland's solution. Among the rooted plants survival of the acclimatized plants was found to be over 90% after six months of *ex vitro* transfer. The yield of the extract produced was 14.55% w/w (72.7935 g viscous extract from 500 g dried powder of callus), with a water content of 4.37% (thermogravimetry method). Phytochemical screening revealed the presence of phenolics and flavonoids. Thin Layer Chromatography (TLC) indicated that EPMC might be present in the EEKGR (Rf = 0.92 compared to that of standard EPMC = 0.92), and kaempferol (Rf = 0.26 compared to that of standard kaempferol = 0.25). The spectrophotometric analysis of EEKGR confirmed the presence of benzoyl and cinnamoyl bands, which positively belongs to flavonoid (UV spectrum = 200-400 nm).

Keywords: Micropropagation, Caulogenesis, Somatic Embryogenesis, suspension culture, *Kaempferia rotunda*

**Antioxidant activity of 1-butyl-3-Methylimidazolium Hydroxide
against hepatic cells of *Mus musculus***

Chaitali Bhasme, N.A. Kamble
Shivaji University, Kolhapur
Email: abchaitali1995@gmail.com

ABSTRACT

The present study aims to evaluate the effect of acute exposure of 1-butyl-3- Methylimidazolium Hydroxide ionic liquid on hepatocytes of *Mus musculus*. Adult albino female mice (*Mus musculus*) were divided into three groups viz. i) control group ii) experiment group I iii) experiment group II. Experiment group I and II were administered orally with 276 and 724 mg/kg (0.5 and 1 Ld50 median lethal dose) respectively. After 10hrs.dose exposure liver was removed and used for the estimation of oxidative stress parameters namely superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPx). The results showed that the level of all three antioxidative enzymes i.e. SOD, CAT and GPx were reduced in experiment group as compared to control group. These finding suggests that 1-butyl-3Methylimidazolium Hydroxide causes oxidative stress in hepatocytes.

Keywords: 1-butyl-3-Methylimidazolium Hydroxide, Ionic liquid, *Mus musculus*, Hepatocyte

**Zebrafish as a model for SARS-CoV-2 infection, pathogenesis,
transmission, and drug screening**

Chinnarajan Ravindran

Biological Oceanography Division,
CSIR-National Institute of Oceanography,
Dona Paula, Goa, India.
Email: cravindran@nio.org

ABSTRACT

COVID-19 (Coronavirus Disease-2019), causative agent Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) requires a host for its infection, replication, and spread. With the availability of several animal models and their limitations, there is a need for an alternative animal model with a high degree of conserved synteny at a laboratory scale. Zebrafish resemble humans in terms of conserved genetic homology aiding to understand the viral pathology and screening a variety of drug molecules. Also, the SARS-CoV-2 transmission was well established via air, infected people, and other surfaces. However, the viral titers in domestic sewage of infected people's excrements transmission through the water bodies were not well studied with a suitable model system. Thus, in the present study, we explore zebrafish as a potential host for SARS -CoV-2 to study the pathophysiology, transmission, and preclinical assessment of drugsinvolved in immune response and viral load reduction against COVID-19.

Keywords: Animal model, COVID-19, SARS-CoV-2, transmission, zebrafish, pathology

**Formulation optimization and evaluation of self emulsifying
nutraceutical pellets**

Dimple S. Sahare, T M. Rasala, Dipti C. Pirwani
Department of Pharmaceutics,
Gurunanak College of Pharmacy,
Nagpur, India.
Email: tirupatirasala81@gmail.com

ABSTRACT

In recent decades there has been a growing interest in relationship between diet and health. Nutraceuticals are the products obtained from various sources viz. food, microorganism, animal etc. providing extra health benefits. The omega fatty acid are found in sea sources like fish as a dietary supplement. In the current research work the vegetable sources was used for extraction of omega fatty acid & studied for its phytochemical evaluation. The nutraceuticals were formulated into selfemulsifying pellets and evaluated for various parameters like hardness, thickness, dissolution & disintegration. The optimized batch shows 96.37 ± 1.39 drug release in 30 min.

Keywords: Nutraceuticals, phytochemicals, dietary supplement, health

SIII-PP-17

Production and characterization of Thermophilic Mannanase from Bacterial isolates of Hot springs of Assam and Arunachal Pradesh, India

Elia Nourin¹, Dibyayan Deb¹, Arabinda Ghosh² and Debabrat Baishya^{1*}

¹Department of Bioengineering and Technology, Gauhati University, Guwahati, Assam, India

²Department of Botany, Microbiology Division, Gauhati University, Guwahati, Assam, India

Email: drdbaishya@gmail.com

ABSTRACT

In this present study novel mannanolytic *Bacillus* was isolated, identified based on 16S rDNA from the hot springs of Assam and Arunachal Pradesh, India. Maximum mannanase production was observed in TB media among other agro residues used. An optimized medium, using potato peel was developed which could result in enhanced mannanase activity at the end of fermentation. To sum up, an extracellular, mannanase has been produced in moderate titer by the isolates in potato peel, a cost-effective agro residue. β -mannanase was purified from extra cellular fraction by a combination of ammonium sulfate fractionation, with a specific activity of 1.165 and 1.085 U/ml. The yield was 18.2%. It revealed a single band of molecular weight of 29 kDa on 12% SDS PAGE. The mannanase displayed high specificity for galactomannan substrates, with no secondary xylanase or cellulase activity. The enzyme lacks a cellulose binding module (CBM), since it was unable to adsorb on cellulose. The end products of heteromannan hydrolysis by purified mannanase were short oligosaccharides compatible with an endo mode of substrate depolymerization.

Keywords: Thermophiles, Mannanase, Hot springs, 16S rRNA

Evaluation of Quorum Quenching and phytochemicals in the Medicinal Plant *Helicteres isora* (valampuri kaai)

Evanjaline Jenifer A., and Sruthi Radhakrishnan*

Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Coimbatore, Tamil Nadu, India.

Email: manonmanisathee12@gmail.com

ABSTRACT

H. isora is an ancient medicinal plant which is otherwise known as Indian screw tree. This study aimed to evaluate the phytochemical constituents' antibacterial and quorum quenching efficiency of the extract of *H. isora*, phytochemical studies of *H. isora* shows the presence of secondary metabolites such as saponins, tanins, flavonoids, and phenols. The antimicrobial activity was determined by agar well diffusion method. Maximum activity was observed at highest concentration (75µg/ml). The extract of *H. isora* shows the inhibition of gram positive bacteria gram positive *Staph aureus* and *Strep aureus* by quenching the quorum sensing molecules. It also shows that *H. isora* has the ability of inhibit protease and lipase activity. The result presented here may suggest that the extract of *Helicteres isora* anti- bacterial property, metabolites and quorum quenching capacity.

Keywords: Quorum quenching, antimicrobial activity, phytochemicals, *Helicteres isora*

**Fungal Diversity and Bioprospecting of Termite-Associated Fungi
from Northern-Western Ghats of India**

Gajanan V. Mane, Rashmi Morey
Prof. Ramkrishna More Arts,
Commerce & Science College Akurdi,
Pune, India- 411044
Email: gajananmane1206@gmail.com

ABSTRACT

Termites constitute 10% of the animal biomass in tropics and subtropical regions of the world and diverse group of more than 3,000 described species in 281 genera and seven families. In India the diversity of termite's fauna restricted to only 337 species and subspecies under 54 genera belonging to seven families. Termites being capable of degrading cellulose from living, dead and decayed wood and other plant materials as well. Cellulose containing agricultural and horticultural crops, agroforestry, stored timbers, books and records, woodworks in buildings and stored products highly damaged due to termites by symbiotic gut microorganisms along with the enzymes. Fungi of termite gut that are the main organism which have the capacity to produce enzymes such as laccases, cellulases and ligninases. In this present work, we studied on the termites gut fungal diversity. 96 Fungal strains were isolated and identified by ITS from the gut of two different termites viz. *Odontotermes assmuthi* and *Odontotermes abesus*. Identified strains were belonged *ascomycota*, *basidiomycota* and *mucormycota* phylum respectively. Isolated strains were screened for the laccase, amylase, cellulase and pectinase enzymes production. 27 strains were positive for laccase, 59 strains were positive for amylase, 71 strains were positive for cellulase and 72 strains were positive for pectinase enzyme. Isolates were screened for secondary metabolites production act as antibiotics against selective human pathogens. 5 isolates were had antimicrobial activity against *Streptococcus pneumoniae* MCC 2425, *Staphylococcus aureus* MCC 2408, *Pseudomonas aeruginosa* MCC 2080, *Escherichia coli* MCC 2412, *Enterococcus faecalis* MCC 2409, *Klebsiella pneumoniae* MCC 2451, *Micrococcus luteus* MCC 2155 and *Candida albicans* MCC1151 Pathogens. HPLC and LCMS were done for compound identification.

Keywords: Termites, ITS, Enzyme, Antimicrobial activity.

SIII-PP-20

Macrophyte diversity and their selection on the basis of efficiency of industrial wastewater treatment in constructed wetland

Garima Madhariya* and Pramod Kumar Mahish
Department of Biotechnology,
Govt. Digvijay P.G. College Rajnandgaon (C.G.).
*Email: gmadhariya43@gmail.com

ABSTRACT

Inadequate sanitation and wastewater disposal technologies may result in environmental and public health issues. Wastewater treatment and recycling techniques will be essential in providing sufficient fresh water in the next decades. Wetlands were shown to be one of the most suitable treatment options for urban wastewater reuse for irrigation in terms of pollution removal. The result showed that *Pistia stratiotes*, *Alternanthera philoxeroides*, *Eichhornia crassipes*, *Polygonum persicaria*, *Ludwigia adscendens*, *Marsilea quadrifolia*, *Nymphaea cristata*, and *Ipomoea aquatica* have the efficiency to reduce BOD up to 93%, 90%, 95%, 90%, 85%, 75%, 73%, and 92.5% respectively and COD removed up to 62%, 60%, 65%, 55%, 50%, 52%, 56% and 61% respectively.

Keywords- Constructed wetland, Macrophytes, Wastewater treatment, Water pollution control

SIII-PP-21

Synthesis of Zinc Oxide Nanoparticles from Ethanolic Extract of Leaves of *Boerhavia diffusa* for their Antibacterial Activities

Gayathri Devi. S, Govarthini. K, Priyadharshini. M.S
Department of Biochemistry, Biotechnology and Bioinformatics
Avinashilingam Institute for Home Science and Higher Education for
Women, Coimbatore, TN
Email: 21phbcf003@avinuty.ac.in

ABSTRACT

Biological methods have been used to synthesize zinc oxide nanoparticles using medicinally active plants having an antibacterial role this made us assess zinc oxide nanoparticles synthesized from ethanolic extract of leaves of *Boerhavia diffusa* for their antibacterial activities. The synthesized plant-mediated zinc oxide nanoparticles were subjected to various characterization techniques such as UV-Visible spectroscopy, Fourier-Transform infrared spectroscopy (FT-IR), Scanning Electron Microscopy (SEM), Energy dispersive analysis of X-rays (EDX) X-Ray Diffraction (XRD). The Zinc oxide nanoparticles of *Boerhavia diffusa* possess better antibacterial activity. Hence, these nanoparticles can be exploited in the future for medicinal use.

Keywords: Zinc oxide nanoparticles, Antibacterial activity, *Boerhavia diffusa*, EDX

SIII-PP-22

**Female heterogamety revealed by ZW:ZZ sex mechanism in a
Noctuid moth, *Heliothesobsoleta*.(Noctuidae : Lepidoptera)**

Geetanjali Sahni

Department of Zoology,
Arya PG College, Panipat
Email: geetanjlisahni8@gmail.com

ABSTRACT

Karyotypable somatic metaphases were successfully obtained in a moth species *Heliothes obsolete* belonging to the family noctuidae of the order Lepidoptera. This was achieved by the modified technique application of *invitro*colchine treatment to the brain ganglia chromosomes of male and female larvae revealing $2n=62$ in both the sexes. The haploid chromosome number of $n=31$ was further confirmed by diakinesis and metaphase I in male meiotic prophase chromosomes where no heteromorphic sex bivalent was identified revealing male to be the homogametic sex. Further, female heterogamety with ZW:ZZ sex mechanism was evidenced on the basis of somatic karyotypes prepared from brain ganglia chromosomal slides using air drying Giemsa staining procedure in contrast to the usual isodiametric chromosomes obtained by conventional methods of acetolactic orcein squash preparation. This first report of identification of ZW:ZZ sex mechanism in the species is worth further investigations by application of differential staining technique of G-banding to the lepidopteran chromosomes.

Keywords: Heterogamety, Karyotypes, Brain ganglia, Somatic chromosomes, Differential

SIII-PP-23

Isolation, identification and molecular characterization of immune defense proteins from *Bacillus thuringiensis* challenged *Spodoptera litura* (Lepidoptera: Noctuidae) larvae

Govindaraj Vengateswari* and Muthugounder Subramanian
Shivakumar

Molecular Entomology Laboratory,
Department of Biotechnology,
Periyar University, Salem, Tamil Nadu, India.
Email*: vengat.ruby@gmail.com

ABSTRACT

Immune defense proteins mainly contribute in insect humoral immune response against microbial infection. In this study we identified immune related proteins which appeared in larval hemolymph of *Spodoptera litura* after *Bacillus thuringiensis* bacterial challenge. SDS-PAGE result shows that high expression of immune defense protein present in the treated sample. Arylphorin, Ecdysone receptor and Apolipophorin- III were top score immune proteins when subjected to MALDI-TOF/MS analysis. Docking result shows the interaction of bacterial cell membrane protein (lipopolysaccharide) with above isolated proteins. The best ranksum score observed in Arylphorin, GOAP Score; -120978.47, DFIRE Score; -92961.59, ITScore; -47803.45. The best interaction which defined by binding position, hydrophobicity, ionization of protein, binding surface, hydrogen bonding of complex observed in Arylphorin. The simultaneous presence of protein in immune hemolymph suggests that they comprise a part of a protein involved in fighting against infection in *Spodoptera litura*.

Keywords: Insect immunity; *Spodoptera litura*; *Bacillus thuringiensis*; Phenoloxidase; Arylphorin, lipopolysaccharide.

***In vitro* callus induction in *Bryonia laciniosa* L., (Shivlingi) Leaves –
a high value medicinal plant**

Hemshankar Sahu*, UjjwalaSupe

Department of Biotechnology,
St Thomas College, Bhilai, Dist-Durg, Chhattisgarh
Email: hemshankarsahu24@gmail.com

ABSTRACT

The world's population has use traditional drugs at about 60 percent. Many endemic medicinal plants, especially *Bryonia laciniosa* L., are facing to extinction as a result of high harvesting, limited distribution and habitat distribution. It is widely used for dermatitis and stomach ache, Urinary problem, fever care, inflammation and also used in induce conception. The efficient *in vitro* callus induction of *Bryonia Laciniosa* was from leaf explants on MS medium with different concentrations and combinations of 2,4-D (3.0 mg/l)+ Kin (1.0mg/l) showed the best response and then NAA (3.0 mg/l)+ BAP (1.0mg). The highest rate of Callus induction was observed from the leaf explants on MS medium with 2,4-D and (3mg/l)+Kin(1mg/l). The regenerated callus were transferred in to half strength MS medium fortified 2,4-D for Callus elongation. The results demonstrated that explants were good source of callus induction, morphology analysis as well as indirect plantlets regeneration.

Keywords: *In Vitro Callus induction, MS medium, 2, 4-D, Kin, NAA and BAP*

Isolation and characterization of 3rd Generation Cephalosporin resistant *Bacillus cereus* from urban environmental soil of West Bengal, India

Jhulan Basu¹, Pranab Giri², Atreyee Kundu¹, Priyanka Bhowmik³

¹Department of Microbiology, Techno India University, West Bengal, India

²Department of Botany, Dum Dum Motijheel College, Kolkata, West Bengal, India

³Department of Biological Sciences, Adamas University,

Email: basujhulan@gmail.com, pri.4383@gmail.com,

atreyee.k@technoindiaeducation.com

ABSTRACT

Abundance of antibiotic resistance in natural environmental flora in recent years has become a threat to public health. Various studies during the last decade have shown that the soil micro flora is a huge reservoir of antibiotic resistant bacteria (ARB) and antibiotic resistance genes (ARG). These environmental resistome is in continuous equilibrium with clinical pathogens with exchange of antibiotic resistance factors through horizontal gene transfer. Anthropogenic activity has significantly increased this telltale series of exchange. Therefore, urban environmental soils are perfect study materials to find environmental ARB and ARGs which may lead to a better understanding of evolution of antibiotic resistance. In this report we discuss about the isolation and characterization of a third generation cephalosporin resistant Gram positive isolate from urban environmental soil. Moreover, the ability of the bacteria to form biofilm in presence or absence of antibiotic has also been discussed.

Keywords: Antibiotics, Soil Bacteria, Antibiotic resistance, *Bacillus cereus*, environmental bacteria

Isolation and characterization of bacteria from soil for the bioconversion of Eugenol to Vanillin as a flavour additive

Jyothsna P. V¹, Brinda Yadav¹, Jyotibrata Mitra², Susweta Das^{1*}

¹ Department of Biotechnology, School of Basic and Applied Sciences, Dayananda Sagar University, Karnataka, India

²Flower Valley Agrotech Pvt Ltd, Bangalore

*Email: susweta@dsu.edu.in

ABSTRACT

The need for microbe-based biotransformation method for synthesis of vanillin (a flavour in high demand) is expanding due to the associated challenges with traditional chemical method and consumer concerns for its production by natural mode. In this study, a bacterial isolate was obtained from soil sample using biotransformative (BT) medium which was capable of producing vanillin using eugenol biotransformation. Screening of these isolates by conventional enrichment process indicated vanillin production among other metabolites. Product confirmation was done by GC-MS analyses. Molecular and phenotypic identification of the isolated bacteria was carried out using 16SrRNA sequencing. Overall observations made in this study demonstrated that this strain can be a potential candidate for biosynthesis of vanillin from eugenol in the ever-demanding flavour industry.

Keywords: Bacteria, Eugenol, Vanillin, Biosynthetic method, Flavonoid, food additive.

SIII-PP-27

**Prevalence and level of antibiotic resistance among naturally
occurring
Escherichia coli and *Pseudomonas aeruginosa***

Kadam T.A*, Sanjay Chavan, Bhagvat Lad and P.O Baisthakur
School of Life Sciences,
Swami Ramanand Teerth Marathwada University, Nanded
Email: takadam67@gmail.com

ABSTRACT

The pathogenic strain of *Escherichia coli* and *Pseudomonas aeruginosa* causes nosocomial and community acquired infections in human. Cephalosporin, aminoglycosides, ampicillin and fluoroquinolones are drugs of choice used to treat the infections caused by *E.coli* and *P.aeruginosa*. Therefore *E.coli* and *P.aeruginosa* from water sources of Nanded region for prevalence and level of antibiotic resistance were analyzed. The identification of isolates was carried out by Morphological and Biochemical tests. Antibiotic susceptibility testing of all isolates was carried out using the Kirby-Bauer method. The *E.coli* and *P.aeruginosa* isolates were observed resistant against β -lactam antibiotics derivatives. The data generated can be useful for monitoring antibiotic resistance development in natural isolates.

Keywords: *E.coli*, *P.aeruginosa*, antimicrobial resistance, antibiotics, water.

Isolation and molecular characterization of symbiotic bacterial of *Steinernema* genera: Biochemical and Biophysical characterization of bacterial secondary metabolites for insect control

Kandhasamy Lalitha, Muthugounder Subramanian Shivakumar*

Molecular Entomology Laboratory,
Department of Biotechnology,
Periyar University, Salem, TN
Email: skentomology@gmail.com

ABSTRACT

This study focused on isolation of two symbiotic bacteria from *S. carpocapsae* and *S. monticolum* infecting *S. litura* larvae. Based on biochemical, physiological and molecular characterization, the isolated symbiotic bacterium was identified as a part of *Enterobacteriaceae* family. Phylogenetic analysis using 16S rDNA sequences of symbiotic bacteria confirmed *X. nematophilla* NP-1 and *Xenorhabdus* sp., NP-2. The optimal growth conditions for NP-1 and NP-2 was found to be between 30 - 35°C. The bacterial cell free supernatant of NP-1 and NP-2 at 40 µl/ml produced 76-80% mortality at 48hrs in *S. litura* larvae. Ethyl acetate extract of NP-1 and NP-2 metabolites were analyzed by FT-IR, which demonstrates the presence of phenols, alkanes, carboxylic acid, aromatics, phosphoric acid while GC-MS analysis shows presence of compounds such as Benzencepropanoic acid, 1, 3, 5 Trichloropent-2-ene, 1,1-Dichloro-2,3- dicmethycycloprone, Octadecanoic acid, 2-Piperidinone and 1,2-benzenedicarboxylic acid etc. These bioactive compounds present in the bacterial supernatant extracts of NP-1 and NP-2 are found to have effective at LC₅₀ 64.954 (µl/ml), LC₉₀154.166 (µl/ml) and LC₅₀ 70.298µl/ml, LC₉₀206.362µl/ml. Antibacterial activity was performed against *K. pneumonia*, *P. aeruginosa*, *E. coli* and *S. aureus*. Potted plant experiment using the extract of NP-1 and NP-2 produced 84 to 86% larval mortality and antifeedant effect on *S. litura* larvae. This study shows that, the symbiotic bacteria *X. nematophilla* NP-1 and *Xenorhabdus* sp., NP-2 secondary metabolites are toxic and can be utilized in insect pest control programmes.

Keywords: Entomopathogenic nematode; *X. nematophilla*; *Spodoptera litura*, Antibacterial activity

Antioxidant, antimicrobial, anti-lipase activity and anti-inflammatory potential of silver nanoparticles synthesized from an endemic climber *Argyrea lawii* C.B. Clarke.

Kapil Shinde¹, Mahesh Mane¹, Ruturaj Patil¹, Aditya Magdum², Mansingraj Nimbalkar², Akshay Jangam³, Ratan More³, Ashok Chougule⁴, Nilesh Pawar^{3*}.

¹ Department of Biotechnology, Shivaji University, Kolhapur

² Department of Botany, Shivaji University, Kolhapur

³ Department of Botany, The New College, Kolhapur

⁴ Department of Chemistry, The New College, Kolhapur

Email. kapilshinde9@gmail.com

ABSTRACT

Innovative development in the realm of nanotechnology is the ecologically friendly synthesis of nanoparticles. Due to its ease of use and environmental friendliness, plant-mediated biological production of nanoparticles has gained popularity recently. This study used aqueous extracts to biosynthesize stable, silver nanoparticles in a straightforward and environmentally benign manner. In this study, silver nanoparticles were synthesized using the *Argyrea lawii* as a reducing agent. The reaction process was monitored by UV-Vis spectroscopy. To optimize the biosynthesis of silver nanoparticles, the effect of process variables such as extract concentrations, mixing ratio of the reactants, and time were also investigated. The biological activity of the silver nanoparticles produced through biosynthesis was also studied. Regarding this, in vitro 2, 2-diphenyl-1-picrylhydrazyl (DPPH), FRAP, ABTS assay was used to investigate the dose-dependent antioxidant activity of silver nanoparticles given by plant phenolic and flavonoid components and found to be comparable to that of standard ascorbic acid. Antilipase activity carry out using the extract. Antimicrobial activities was studied using various pathogen such as *Candida albicans*, *E.coli*, *Pseudomonasaeruginosa*. Thesame is true for *Argyrea lawii* anti-inflammatory properties, where it has a higher test inhibition % than aspirin. The aqueous extract of *Argyrea lawii* and its silver nanoparticles recorded the strongest in vivo antioxidant effect, according to the data.

Keywords: *Argyrea lawii*, AgNP'S, DPPH, FRAP, ABTS, *Candida albicans*, *E.coli*, *Pseudomonasaeruginosa*, antilipase activity, Anti-inflammatory.

Effect of aqueous extracts of *Sesbania sesban* on peroxide levels in serum, spleen, thymus and hindpaw of experimental animals

Kathiravan Subramanian^{1&2} and Shwetha Vijesh Kalava¹

¹Department of Biochemistry, Kongunadu Arts and Science College
(Autonomous),

Coimbatore, Tamil Nadu, India.

²Department of Biochemistry, St.Francis College for Women,
Hyderabad, Telangana, India.

Email: kathiravanbiochem@gmail.com

ABSTRACT

This study was performed to analyse the effect of aqueous seed extract of *Sesbania sesban* on the lipid and hydrogen peroxide levels in serum, spleen, thymus and hindpaw of experimental animals induced with inflammation. The drug induced experimental animals were given two different concentrations of plant extract viz. 150mg/kg body weight and 300mg/kg body weight through oral mode. After induction and treatment, the study tissues and serum were isolated and the levels of lipid and hydrogen peroxides were estimated and analysed. The results showed the protective nature of the plant extract in reducing the inflammation and restoring the antioxidant levels.

Keywords: Aqueous extract, *Sesbania sesban*, peroxides, inflammation, experimental animals

Investigation of non-enzymatic antioxidant activities of ethanolic extracts of Indian medicinal plants on streptozotocin-induced diabetes in rats

Kavitha R

Department of Biotechnology,
Periyar University Centre for PG and Research Studies,
Dharmapuri, Tamil Nadu, India
Email: erokavi_vasu@yahoo.com

ABSTRACT

The present study was undertaken to investigate the effects of ethanolic extracts of leaf and fruit of *Trichosanthes dioica* and leaf of *Clitoriaternatea* on non-enzymatic antioxidant system in streptozotocin (STZ)-induced diabetic rats. Male Wistar albino rats divided into eleven groups of six rats each were assigned to non-diabetic and diabetic groups (Group I to XI). Diabetes was induced in rats by single intraperitoneal administration of STZ. Groups I and II were kept as non-diabetic and diabetic control. The other diabetic groups (Group III to Group X) were treated with both individual and combined ethanolic extracts of *T. dioica* and *C. ternatea* at the doses of 200, and 400 mg/kg of bw were administrated for 28 days. Group XI was treated with Glibenclamide (600 µg/kg bw), a standard drug for comparison. After completion of experimental period serum, liver and kidney were used for estimating GSH, plasma, and liver for estimating Vitamin E, C and A, in the diabetic rats. A significant increase in GSH, Vitamin E, C and A levels were observed in diabetic rats treated with ethanolic extracts of *T. dioica* and *C. ternatea* compared to diabetic rats. These results suggest that *T. dioica* and *C. ternatea* are beneficial in the control of diabetes by their noticeable antioxidant property.

Keywords: *Trichosanthe dioica*, *Clitoriaternatea*, Non-enzymatic antioxidants, Glibenclamide

Mechanism based antifungal activity of green synthesized silver nanoparticles from haloalkaliphilic *Streptomyces* sp. against some important phytopathogens

Kiran Marathe^{1*}, Jitendra Naik ²and Vijay Maheshwari¹

¹School of Life Sciences, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, MS, India

²University Institute of Chemical Technology, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon, MS, India,
Email: marathekiran23@gmail.com

ABSTRACT

Present study reports synthesis of silver nanoparticles (AgNPs) using haloalkaliphilic salt tolerant *Streptomyces* spp. which are characterized by a range of techniques. TEM and SEM images of biogenic AgNPs showed spherical shape nanoparticles with average particle size of 5-20 nm. The AgNPs were found to be negatively charged (zeta potential -8.12 mV) and XRD confirmed their crystalline nature. The synthesized AgNPs showed significant antifungal activity against some phytopathogenic fungi, *Fusarium verticillioides*, *Rhizoctonia solani* and *Ustilago maydis*. Histochemical, microscopic and biochemical approaches were employed to find out cause of antifungal activity of AgNPs against *F. verticillioides*. At 100 µg/ml concentration of AgNPs, (i) the hyphal growth and germination rate of conidia were significantly inhibited and (ii) about 42.85 % reduction of ergosterol biosynthesis was observed. Propidium iodide staining and increase in relative conductivity of cell membrane as a function of treatment with AgNPs confirmed involvement of cell membrane.

Keywords: Antifungal activity, silver nanoparticles, phytopathogenic fungi.

SIII-PP-33

Studies on Plant Growth Promoting (PGP) Potential of Endophytic Bacteria Associated with Ethnomedicinal Plants of Manipur

Khullakpam Shaheen and Debananda S Ningthoujam*
Microbial Biotechnology Research Laboratory (MBRL),
Department of Biochemistry,
Manipur University,
Canchipur, Imphal, Manipur
*Email: debananda.ningthoujam@gmail.com

ABSTRACT

41 endophytic bacteria isolated from *Catharanthus roseus* (Saheb-lei) and *Celtis timorensis* (Heigreng) were subjected to antibacterial, antifungal and PGP assays. Two promising strains, DNR9 and DNS4, selected for plant growth promotion studies on rice (Variety: *Jatra*), exhibited promising antimicrobial and PGP potential. They were characterized by 16S rDNA sequencing and UPLC-MS analysis to profile the major bioactive secondary metabolites. Some bioactive compounds detected include Istamycin C1, 7(14)-Bisabolene-2, 3, 10, 11-tetrol, Ferimzone, Rishitin, etc. These strains hold promise for development as potential bioinoculants for rice. Detailed findings on these studies will be presented in this paper.

Keywords: Endophytic bacteria, ethnomedicinal plants, plant growth promoting, seed vigor assay, pot trials, bioactive compounds

**Comprehensive evaluation of viral protein structure using
Ramachandran plot**

Kowsalya Devi, V. and K. Niranjana Devi

Department of Physics,
Sri Sarada College for Women (Autonomous)
Tirunelveli, Tamilnadu, India.
Email: niranjanamariyammal@gmail.com

ABSTRACT

Proteins have a significant role in RNA genome mutation. Because mutants are important in taxonomy reports, we need to research protein structural analysis. The central challenge of computational structural biology is to convert the large number of sequence information into biochemical and biophysical knowledge, as well as decode the structure, function and evolutionary cube encoded in biological sequence language. The Ramachandran plot displays the main chain conformation angles (Ψ) of the polypeptide chain of a protein molecule. This paper aimed to analyze viral protein and its structure by different studies with the use of PyMOL software. Ramachandran Plot The understanding and optimization of protein-ligand interactions are instrumental to medicinal chemists investigating potential drug candidates.

Keyword: *Protein structural analysis, Ramachandran plot, protein data bank and pymol.*

SEM & FTIR analysis of rice husk to assess the impact of physiochemical pretreatment

Latika Bhatia, Shruti Singh, Rajnandini, Tejaswini Jaiswal
Department of Microbiology & Bioinformatics,
Atal Bihari Vajpayee University
Email: latikabhatia1@yahoo.co.uk

ABSTRACT

Pretreatment step is one of the pivotal processes in the exploitation of lignocellulosic biomass for bioethanol production. An ecofriendly system only allows mild pretreatment strategies for industrial bioethanol production. The steam explosion pretreatment process is reported to be efficient in arranging rice husk for these procedures with the use of mild acids or bases. In the current work, pretreatment method like steam explosion pretreatment method was used with NaOH and HNO₃ to degrade the complex structures and release the sugars entrapped within lignin. The pretreatment effect on the matrix of husk cell-wall and its constituents are characterized microscopically (scanning electron microscopy) and spectroscopically (Fourier Transform Infrared Spectroscopy) in order to comprehend the future possibility of its digestion by cellulase. The crystallinity index of native substrate is very high (0.94 cm⁻¹), which reduced significantly to -0.277 and -0.34 cm⁻¹ when pretreated with 2% HNO₃ and 10% HNO₃ respectively. The steam explosion pretreatment does not support degradation of the cellulosic fibrillar arrangement, but causes intense re-localization of lignin. The images of scanning electron microscopy were in agreement with the findings of Fourier Transform Infrared Spectroscopy; the ordered structure generally found in native rice husk was missing, suggesting that the structure of the 2% HNO₃ treated rice husk was more amorphous. Partial removal of hemicelluloses and complete removal of wax is the outcome of this research work. Results revealed that steam explosion pretreatment increases the possibility of digestion by enhancing cellulose accessibility through lignin re-localization and a partial elimination of hemicelluloses rather than by cell wall disruption.

Keywords: Bioethanol; rice husk; steam explosion; FTIR; SEM and crystallinity index

Degradation of Dye Using Nano Particles with the Help of Organic Extracts

Madhubala, E., M. Nithyasri, Kevin Prithivi. R, Subhasri T, Swathi Sree G, Saranya R. S*
Department of Biotechnology,
Rathnavel Subramaniam College of Arts and Science,
Sulur, Coimbatore
Email: saranya.ya@gmail.com

ABSTRACT

Industrial revolution as marked a strong impact of economy and financial upgradation which includes advantages and disadvantages. Major impact include environmental pollution. It creates major impact on environmental because of the release of unwanted products in air and inside the water bodies. The uses of die as increased in varies industries like food, leather, textile, paper, cosmetics, pharmaceuticals etc. The problem as emerged because of disposing of dye in open environment which leads major issues in human health, aquatic life, animals life. In this role nano particles is used for eliminating the dye from industrial water the nano particle ZnO and CuO. The lemon peel was soaked in the water for overnight and the water was collected as a sample. There are two types of dye used in this paper work they are blue RR and red RR dye. The adsorption of dye is determined in a particular interval of time measured using calorimeter. FTIR (Fourier transform infrared spectroscopy) was done to identify the rate of adsorption, emission and photoconductivity of dye sample. The calorimeter shows the reading of different values (0.74, 0.66, 0.84, 0.70, etc..) based on dye and extract and compared.

Keywords: Degradation, nano particles, photoconductivity, Industrial revolution.

Green Synthesis of Silver Nanoparticles using different plant extracts and Study of its Antibiotic and Antioxidant activity

Madhuri T. Thakre, Rignved Kedarpawar, ***Mokshada Balaskar**, Anushka Deogirkar, Chaitanya Bobde and Himanshu Pachare

Department of Molecular Biology and Genetic Engineering, Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, Maharashtra, India
Email: madhurithakrekatre@gmail.com, *mokshadabalaskar@gmail.com

ABSTRACT

Nanoparticles are colloidal systems with particles varying size from 10 to 1000 nm. Nanoparticles can be synthesized using various accesses including chemical, physical and biological methods. The conventional methods for the production of nanoparticles are expensive, toxic, and non-environment friendly. To overcome these problems, researchers have found the precise green routes, i.e., the naturally occurring sources and their products that can be used for the synthesis of nanoparticles. In the present investigation. Green synthesis of silver nanoparticles using four plants extracts of *Teramnus labialis*, *Vernonia elliptica*, *Pentas lanceolata* and *Cajanus scarabaeoides* which are dicotyledonous plants with high secondary metabolites and all has different medicinal properties and also locally available. The phytochemical analysis of both fresh and powdered form shows the presence of quinines, saponins, tannins, phenol, terpenoids, steroids and proteins. The secondary metabolites of these plants were act as a reducing and stabilizing agent for silver ions where AgNPs has been synthesized using silver nitrate as a precursor. The characterization was done successfully by visual confirmation, UV-Spectroscopic analysis and FTIR analysis. UV- Spectroscopic analysis shows the absorption peak of silver nanoparticles at 400 to 450 nm, confirming the synthesis of silver nanoparticles. Antibacterial activity was successfully performed with synthesized AgNPs against human pathogenic bacteria *Escherichia coli*, *Klebsiella pneumonia* and *Staphylococcus aureus* with AgNO₃ and standard antibiotic Chloremphenicol by well diffusion method. Quantification of the antioxidant activity of silver nanoparticles using DPPH. The synthesis of silver nanoparticles from these plant materials is not reported earlier.

Keywords: Silver Nanoparticles, *Teramnus labialis*, *Vernonia elliptica*, *Pentas lanceolata*, *Cajanus scarabaeoides*, Antibacterial activity and Antioxidant activity.

SIII-PP-38

**Green Synthesis of Silver Nanoparticles using the aqueous extract of
Ocimum sanctum and analyzing its antioxidant and anti-
inflammatory activity**

Malarvizhi, A., PKM Anugeetham, Nandhini K
D. G. Govt Arts College, Mayiladuthurai
Email: malarbaalu@gmail.com

ABSTRACT

Silver nanoparticles of *Ocimum sanctum* was prepared and characterized by UV Visible spectroscopy. This extract was utilised for finding out the antioxidant and anti-inflammatory activity. The phosphomolybdenum assay for total antioxidants showed a dose dependent scavenging of free radicals. The nitric oxide scavenging activity was also dose dependent indicating the antioxidative behaviour of the extract. The extract also showed anti-inflammatory activity which was comparable with the standard drug

Keywords: *Ocimum sanctum*, Silver nanoparticles, Green synthesis, Antioxidant, Anti-inflammatory

GC-MS evaluation of the bioactive constituents with antioxidant and antidiabetic potentialities of *Acampe ochracea* (Lindl.) Hochr.

Manoj G.S.*, Navami Asok A.S & Aparna A.P

Post Graduate and Research Department of Botany Mahatma Gandhi
College Thiruvananthapuram, Kerala, India.

Email:manojmalackal@gmail.com

ABSTRACT

Acampe ochracea (Lindl.) Hochr. is an epiphytic orchid with thick leaves was known in Chinese medicine as reliever of hepatotoxicity. Plant's secondary metabolites have long been used as an integral part of drug designing and drug discovery although their way of preparation is a matter how they impact in in vivo system. Based on this the present work was designed to evaluate its phytochemical constituents and free radical scavenging activity of hot Soxhlet extracts. The phytochemical screening of methanolic extracts revealed the presence of alkaloids, flavonoids, phenols, terpenoids and primary metabolites. Based on the quantitative estimation studies it revealed remarkable amount of phenolic metabolites. Total phenolic content (mg QE/g crude extract) and total flavonoid content (mg GAE/g crude extract) were 86.92 ± 7.03 and 52.75 ± 2.15 respectively. The extracts were subjected to antioxidant assay like DPPH free radical scavenging assay and reducing power assay. The result revealed significant DPPH scavenging and reducing power activity with the methanolic extract. Further, anti diabetic effect was also analyzed and showed potential alpha amylase inhibitory effect. Subsequently, GC-MS analysis of *Acampe ochracea* methanol extract revealed the presence of major 12 bioactive compounds such as 2,4,6,8,10-Tetradecapentaenoic acid, Paclitaxel, Phenylalanine, 4-amino-N-t-butyloxycarbonyl-, t-butyl ester, 2,4,6,8,10-Tetradecapentaenoic acid, Octadecane, 3-ethyl-5-(2-ethylbutyl)-, Tetraacetyl-d-xylonic nitrile, Ethyl iso-allocholate, Hexadecane, Octadecane, 3-ethyl-5-(2-ethylbutyl)-, Tetradecane, 2,6,10-trimethyl-, Octadecane, 3-ethyl-5-(2-ethylbutyl)- that were analyzed with retention time, peak area and percentage of area. Hexadecane was the major constituent and was the first report in *A. ochracea* with a peak of 79140883.98 and peak area 17.68 %. All bioactive compounds noticed in the extracts have medicinal properties against many diseases. The phytochemicals recorded in the species suggests their effects in amelioration of chemical induced liver injury, anti-inflammatory and antimicrobial features. Future studies are planned in terms of carbon tetrachloride -induced hepatotoxicity by

inhibiting oxidative stress and up regulating antioxidant genes in *in vivo* models.

Key words: Orchidaceae, antioxidant activity, *Acampe* sp., alpha amylase, GC-MS, Hexadecane, Phenylalanine, 4-amino-N-t-butylloxycarbonyl-, Tetraacetyl-d-xylonic nitrile, Ethyl iso-allocholate

***In vitro* cytotoxicity analysis of a secondary metabolite dimer of
epicatechin (novel metabolite) from an endophytic fungus
Curvularia australiensis FC2AP**

Manon Mani V*, A.Parimala Gnana Soundari, Sharnisha,S,
M.Kangathara,V

^a Department of Biotechnology, Rathnavel Subramaniam College of Arts
and Science, Coimbatore, Tamil Nadu, India.

Email: *manonmanisathee12@gmail.com

ABSTRACT

Cervical cancer in women has been a dramatic health issue in this world. To overcome this issue it is must to intake more amount of antioxidants in our daily diet. Now the research is mainly dependent on the bio products extracted from microbial origin and these bio products have been implemented in medicinal field to cure these diseases. This investigation mainly focused on anticancer potentiality of a flavonoid grouped secondary metabolite dimer of epicatechin extracted from *Curvularia australiensis* FC2AP, an endophytic fungus isolated from *Aegle marmelos*. The dimer of epicatechin compound was found to contain efficient antioxidant properties at minimum concentration. The scavenging mechanism was in a stipulated range and the compound explored its scavenging properties by trapping the free radicals. The anticancer potentiality and apoptosis induction of the bioactive compound was exploited by MTT and FACS analysis in fibroblasts and HeLa cell lines. The compound manifested its anticancer property in cervical cancer cells and the apoptosis induction on cancer cells was maximum at minimum concentration. Thus the dimer of epicatechin compound played an important role in inducing apoptosis in cancer cells. This is the first report of anticancer property exhibited by the compound dimer of epicatechin from an endophytic fungus *C. australiensis* FC2AP. Further studies will be implied to assess the anticancer potentiality through *in vivo* studies.

Keywords: Anticancer, apoptosis, cervical cancer, *C. australiensis*, dimer of epicatechin.

A Comparative study of Chitinase biosynthesis by free and immobilized marine bacteria *Pseudomonas putida* Mb12

Mini K. Paul^{*1}, Amrita Dinesh¹ and Jyothis Mathew²

^{*1}Department of Biosciences, MES College, Marampally, Aluva, Ernakulam, Kerala, India.

²School of Biosciences, MG University, Kottayam, Kerala
Email: minikpaul2016@gmail.com

ABSTRACT

The production of chitinase by *Pseudomonas putida* Mb12 was analyzed utilising both free and immobilised cells. The biotechnology sector is fascinated in immobilised microbial cells due to their increased performance. This innovative approach removes the majority of the limitations that free cells experience. Production and optimization of chitinase by Ca-alginate immobilized *P. putida* Mb12 was carried out using prawn shell as cost-effective substrate. Beads made with 3.0% Na-alginate, 0.5 M CaCl₂, and a 60-minute curing time displayed superior beaded stability and enabled the highest chitinase output. The conditions of 0.5 percent prawn shell powder, 35°C, pH 6.0, and 50 rpm agitation were determined to be optimum for maximal enzyme synthesis by immobilised *P. putida* Mb12. However free cell requires 0.4 percent prawn shell powder, 40°C, pH 7.0, and 250 rpm agitation. Immobilised *P. putida* Mb12 were more resistant to environmental changes such as temperature, pH i.e., they maintained 90% of its maximal activity at 30–65 °C and 100 percent activity between pH 5-10. The fermentation and thermodynamic parameters demonstrated that immobilised cells can produce 1.5 times more enzyme than free cells. Immobilised *P. putida* Mb12 were retained about 90% of its initial activity after one month.

Keywords: Chitinase, Calcium alginate, immobilization, *Pseudomonas putida*

Mycogenesis of iron nanoparticles using *Aspergillus fumigatus* fungi and their Larvicidal, Antibacterial and Photocatalytic applications

Muthugounder Subramanian Shivakumar, Murugan Arunthirumeni,
Rajalingam Divya Dharshini
Periyar University
Email: arunthirumeni456@gmail.com

ABSTRACT

Most insects have resistance to various synthetic insecticides, hence an effective alternative biocontrol techniques should be develop in future. Biological synthesis of nanoparticles, using microbes is the most proficient method in terms of ease of handling and reliability. In methodology, simple method was used for ferric chloride salt solution and fungal extracts of *Aspergillus fumigatus* as precursors for synthesizing nanoparticles. Dark brown color of the solution indicated towards the synthesis of iron nanoparticles (FeNPs). Nanoparticles characterized by UV-Vis Spectrophotometry which showed absorption at 325nm, FTIR analysis indicated the presence of certain functional groups such as amines, alkanes, phosphines, sulfoxides, alkynes, aromatics and nitro groups, XRD analysis determined the crystalline structure with face centred cubic facets. SEM determined FeNPs were irregular in shape and EDaX reflects that out of the synthesized NP 81% was iron atoms. The synthesized iron nanoparticles were tested for larvicidal efficacy against *Spodoptera litura* and two mosquito species *Culex quinquefasciatus* and *Anopheles stephensi* at different time intervals. Different concentrations of FeNPs were used for antibacterial testing against *Pseudomonas aeruginosa* comparative with the standard antibiotic chloramphenicol. Moreover, Photocatalytic dye degradation was done using the FeNPs synthesized using secondary metabolites of *A. fumigatus* fungus against four different dyes which was performed under direct sunlight. Our study findings suggest that the FeNPs has less efficiency in degrading the dyes, among all tested dyes the highest of 20% degradation observed in Xylenol orange. This study shows that FeNPs possess a good antimicrobial and insecticidal activity which can be explored for commercial purposes.

Keywords: *Aspergillus fumigatus*; FeNPs; *Spodoptera litura*; Larvicidal; antimicrobial; Photocatalytic

SIII-PP-43

Role of filarial cystatin in immunopathogenesis of lymphatic filariasis: an *in silico* investigation

Nabarun Chandra Das, Suprabhat Mukherjee
Integrative Biochemistry & Immunology Laboratory, Department of
Animal Science,
Kazi Nazrul University, Asansol, West Bengal, India
Email: nabarunchandradas@gmail.com

ABSTRACT

Lymphatic filariasis (LF) is the most debilitating mosquito-borne parasitic disease and its prevalence is reported in 47 countries globally. Cystatin, an immunomodulatory protein of filarial parasite plays pivotal role in prolong survival within the host. Herein, we have investigated the molecular reason behind this anti-inflammatory trait of the filarial protein. We have explored in-silico approaches to understand the interaction pattern of cystatin of *Wuchereria bancrofti* with human toll-like receptors (TLRs). Our findings indicated that cystatin-TLR4 interaction triggers the alternative activation pathways to establish an anti-inflammatory milieu and provide a novel dimension to the existing knowledge on filarial immunopathogenesis.

Keywords: Cystatin, Filarial parasite, TLR4, Molecular docking, Molecular dynamics.

**Formulation and evaluation of a polyherbal facial sheet mask with
10 active natural components**

Nagawri. R, Brindhavanam. P.T, Janani. T, Saivarshini. S,
Elangovan. N* and Kavitha. R*

Molecular pharmacology Laboratory, Department of Biotechnology,
School of Biosciences,
Periyar University, Salem, Tamil Nadu, India.
Email: nagagowriramesh2000@gmail.com

ABSTRACT

The herbal cosmetics are natural one which are unbound to chemical harmful substances. Pollution, dirt and dead cells are prone to the Facial skin. On account of eliminating the dead cells and to make the skin healthier, clean and nourishing we prepared the polyherbal facial sheet mask using *Opuntia*, *Liquorice*, *Senna auriculata* which are safer to use and they also possess antioxidant, anti-aging and antimicrobial properties. Sheet mask are the most booming one but those are all made of chemicals, to make an alternative of it we make polyherbal facial sheet mask. The bioactive compounds are extracted by using the Ethanol (polar) and Hexane (Non-polar) solvents. To check effectiveness various tests are performed like toxicity test (Using *Caenorhabditis elegans*), Microbial test and Patch test. Thus, the prepared formulation shows good smoothing, healthy and glowing skin. Ethanol extract gives the better results compared to the Hexane extract.

Keyword: Herbal sheet mask, *Opuntia*, *Liquorice*, *Senna auriculata*, Toxicity test, Microbial test, Patch test.

Phylogenetic and Phylogeographic Inference of Indian Pheretimoid group of Earthworm

Nalini Tiwari, Shweta Yadav
Department of Zoology,
Dr. Harisingh Gour Vishwavidyalaya (A Central University)
Sagar, Madhya Pradesh
Email: n.tiwari2987@gmail.com

ABSTRACT

The Pheretimoid earthworm belongs to the family Megascolecidae, is the largest group of earthworms that dominates other earthworm families in eastern Asia and the Pacific region. Earlier in Cenozoic era, there were hasty shifts in the plate boundaries in the eastern Asian and Pacific regions as a result of significant collisional activities. Like, India collided with Asia, 45 million years ago. Around 5 million years ago, plate motions and boundaries shifted once more. Resulting in the present-day distribution of the earthworm species might have been impacted by these geological processes and plate tectonic evolution. The study elucidated the Pheretima complex's current taxonomic and evolutionary position along with its global range using DNA barcoding approach.

Keywords: COI-1, Earthworms, India, Molecular systematics, Species delimitation

Studies on the organic and inorganic composition of a poly herbal formulation and evaluate its *in vitro* anti-oxidant and anti-diabetic properties

Narendhirakannan RT*, Bindu Jacob
Department of Biochemistry,
Kongunadu Arts and Science College,
G.N. Mills (PO), Coimbatore, Tamil Nadu. India.
Email: rtnaren@kongunaducollege.ac.in

ABSTRACT

Diabetes, a metabolic disorder that develops several complications. Combination herbal therapy plays an important role in the management of type 2 diabetes mellitus (T2DM) and its related complications. This research was conceived to develop a polyherbal anti-diabetic formulation comprising of ethanolic extract of *Gymnema sylvestre* (Retz.) R.Br., *Murraya koenigii*, *Cinnamomum verum*, *Phyllanthus emblica* L, and *Syzygium cumini* (Linn.) and assessing the presence of secondary metabolites and mineral composition both qualitatively and quantitatively to correlate the therapeutic efficacy of these organic and inorganic components through the antioxidant properties by performing DPPH, •OH, O₂•⁻ free radical scavenging assays and reducing power assay. Further, the *in vitro* anti-diabetic assays were done for the polyherbal preparation. It was observed that the polyherbal formulation was rich in polyphenol and flavonoid contents along with they were found to contain essential constituents such as trace elements, which play a significant role in the treatment of Diabetes Mellitus. It also possessed good anti-oxidant properties and significant α-glucosidase and α-amylase activities with IC₅₀ values 37.96 μg and 56.92 μg respectively and well compared with the standard drug acarbose. However, further studies should be conducted using *in vivo* model to elucidate the effect against free radicals and anti-diabetic activity in the treatment of type 2 diabetes.

Keywords: Diabetes, Medicinal plants, Polyherbal, Phytochemical, Antioxidant.

SIII-PP-47

Encapsulation of *Diplocyclos palmatus* (L.) C. Jefferey (Shivlingi): A Medicinal Plant

Nikita Mishra¹, Ujjwala Supe²
Department of Biotechnology,
St. Thomas College, Bhilai, Chhattisgarh
Email: nikitamishra150@gmail.com

ABSTRACT

Encapsulation methods in plant tissue culture are increasing day by day. Many endangered plants can be saved by using this method. There is such a *Diplocyclos palmatus* a medicinal plant is in endangered condition. Shoot tip and nodal segment of this plant were encapsulated through different concentration of sodium alginate and calcium chloride and inoculated in MS medium supplemented with different concentration of auxin and cytokinin. Initiation of shoot observed in both nodal segment and shoot tip with 3% sodium alginate and 100 mM calcium chloride and 2% of sodium alginate and 75 mM calcium chloride and MS media was supplemented with 3 mg/l BAP and 1 mg/l NAA. Non encapsulated shoot tip and nodal segments showed low initiation as compared with encapsulated beads.

Keywords: Encapsulation, *Diplocyclos palmatus*, Endangered, MS medium

Radioprotective Efficacy of *Opuntia elatior* on biochemical parameters in Swiss albino mice

Neelam Nagora

Department of Zoology,
Govt. Girl's College, Ajmer
Email: nagoraneelam@gmail.com

ABSTRACT

The radioprotective efficacy of *Opuntia elatior* different extracts viz. Acetone and Petroleum Ether have been investigated in Swiss albino mice at various i.e. doses 6 Gy and 8 Gy of gamma radiation. 4 groups were divided in the presence (experimental) or absence (control) of *Opuntia* extract (10 mg/kg body wt.) to know the concentration of CFU, GSH and LPO activity. These are Group I without any treatment as control, Group II treated with 10 mg/kg body weight dose of plant extract, Group IV treated with *Opuntia elatior* extract (10 mg/kg body weight) and 6 Gy gamma irradiation dose, Group III treated with 6 Gy gamma irradiation. These animals were sacrificed and their spleen was dissected and further biochemical parameters were studied. In the present investigation effect of acetone and petroleum ether extract of the stem was observed on levels of CFU, LPO, and GSH. In acetone extract, the CFU level was significantly reduced when exposed to radiation as compared to control, which further improved when treated with plant dose as compared to control (12.64 to 14.77) on the same day of exposure. When further studies were done on different time intervals it was observed that CFU content was increased from 1 to 30 days in all groups except groups exposed to gamma radiation (12.64 to 10.2). When studies on GSH were done it was studied that level was again decreased in group exposed to gamma radiation which improved after treatment with plant dose (10.88 to 12.49). When studies were done on increasing time intervals it was observed that in all the groups GSH content increased along with time intervals i.e. maximum at 30 days. Further, when LPO studies were done it was observed that it was maximum in group treated with gamma radiation (71.44) which decreased thereafter when treated along with plant dose (66.17). When studies were done on the basis of time intervals it was observed that level was increased (from 1 day to 30 days) except on day 30 on which the level was decreased. In petroleum ether extract it was observed that CFU level decreased significantly in group treated with gamma radiation (11.49). On the basis of time interval it was observed that level increased in all group except group exposed to gamma

radiation. In the case of GSH it was observed that the value decreased in all the groups. When time interval was counted we observed that GSH level was increased in all the groups along with the increase in time duration. Here also we observed that LPO increased in group treated with gamma radiation which thereafter reduced when treated with plant dose. With the increase in the time interval, the level was increased except in the group treated with plant dose along with radiation on 30th day where the level decreased.

Artificial chemicals are generally recommended as radioprotectants but since they have high toxicity and side effects, their consumption is limited, plant-based radioprotectants may act as an efficient resource due to their nontoxic nature without side effects.

Keywords: *Opuntia elatior*; Gamma radiation; CFU; GSH; LPO; Mouse

**The Effect of Chemical Constituents on *In Vitro* Multiplication of
Tecomella undulata G. Don.**

Nikita Gautam, Priyanka Faroda, Amit Kumar Gupta
Department of Botany,
Mohanlal Sukhadia University, Udaipur-313001, Rajasthan (India)
Email: gautamnikita2909@gmail.com

ABSTRACT

Tecomella undulata is an endangered plant species of the Indian desert ecosystem. Exploitation under timber industries reduces the survival of this plant in its natural habitat. Plant tissue culture techniques can supplement the commercial demand for this plant. We use the mature nodal segments and modified semisolid MS medium, especially with reduced ammonium ion and agar concentration for clonal propagation. The antioxidants fortification like Ascorbic acid, Adenine sulfate, Arginine, PVP, and Citric acid in nutritive media reduce the leaching of phenolic during *in vitro* development of plantlets. The lower concentration of Thidiazuron alone is effective in bud breaking. Further, the combination of 6-Benzylaminopurine and Kinetin along with auxin especially Indole acetic acid favors the multiplication of axillary shoots.

Keywords: *Tecomella undulata*, Clonal propagation, Multiplication, Chemical constituents.

Isolation and purification of lectin from Kodo millet (*Paspalum scrobiculatum*)

Padmika Madushanka Wadanambi¹, Haema Latha¹, **Evan Joseph**³&Kokila S²

¹Department of Biochemistry, Indian Academy Degree College, Hennur cross, Bengaluru.

²Department of Biochemistry, The Oxford College of Science, HSR Layout, Bengaluru.

³Department of Biotechnology, The Oxford College of Science, HSR Layout, Bengaluru.

Email: kokila.s1281@gmail.com

ABSTRACT

Lectins are structurally diverse carbohydrate-specific proteins. Legumes are most important source of lectins. We have used millet seeds for the purification of lectin. Lectin extraction and assay was optimized for extraction buffer, plant extract concentration, blood group identification, RBC suspension buffer, percentage RBC suspension, carbohydrate specificity. We report, O+ blood group, optimal buffer as TBS (pH 7.6) and 10% RBC suspension showed the most promising hemagglutination. Kodo millet seed extract was used for partial purification using ammonium sulphate salt precipitation, followed by size exclusion chromatography (Sephadex G-100). Salt precipitation showed 10-fold purification, final pool compared to crude was 40-fold purity.

Key words: Kodo millet, *Paspalum scrobiculatum*, Lectin, Sephadex G-100.

Green remediation of toxic metals contaminated industrial soil using *Kitasatospora aureofaciens* immobilized wheat straw biochar and *Zea mays*

Parimala Gnana Soundari Arockiam Jeyasundar^{1*}, Muhammad Azeem², Manon Mani V¹, Saranya R S¹ and Shruthi Radhakrishnan¹

¹Department of Biotechnology, RathnaVel Subramaniam College of Arts and Science, Suler, Coimbatore, India

²Institute of Soil and Environmental Sciences, Pir Mehr Ali Shah Arid Agriculture University Rawalpindi, Punjab.

Email: apgs_1987@yahoo.co.in

ABSTRACT

Microorganism-assisted phytoremediation is being developed as an efficient green approach for management of toxic metals contaminated soils and mitigating the potential human health risk. The capability of plant growth promoting Actinobacteria (*Kitasatospora aureofaciens* strain V8-2V (Accession: MT7298270: KA) and wheat straw biochar (500°C: 0%, 1%, and 2% BC0, BC1 & BC2) to improve soil properties and enhance phytoextraction of chromium-Cr by *Zea mays* was studied by employing greenhouse pot experiments. The study enriched the soil microbial community which are important lineages for maintaining soil ecological activities as evinced by the soil microbe analysis. The KA-loaded wheat straw biochar (BC1) improved the levels of alkaline phosphatase, β -D glucosidase, dehydrogenase, sucrase and urease as compared to the control. This amendment (BC1) also triggered the plant growth potentials as from the results of improved plant fresh weight, pigments, and antioxidants. The amendment significantly enhanced the Cr bioavailability (DTPA extractable) therefore, significantly Cr extraction by roots and shoots. The phytoextraction indices indicated that *Zea mays* is an efficient accumulator of Cd and Zn. Overall, KA loaded BC can be an effective solution for enhancing phytoremediation potential and thus reducing the potential human health risk from Cr-contaminated soil. The field studies may further credit the mechanisms of KA-loaded biochar in remediating the Cr- contaminated environments.

Keywords: Remediation, Cr contamination, Actinomycetes, Wheat straw biochar, pyrolysis, Immobilization

**Assessment of airborne fungi at different altitudes in Tumkur city
India**

Pavan R and Chandrashekar S. C.
Department of Microbiology,
Sri Siddhartha Medical College and Hospital,
B.H. Road, Tumkur
Email: drpavanr@gmail.com

ABSTRACT

Fungi find every favorable condition for their growth and development. Factors such as temperature, relative humidity, infiltrations in the building structure and availability of nutrients may be associated with the success of the presence of fungi in air. Fungi can put at risk the health of occupants of a given environment, favoring the emergence of allergies and serious infections. Allergens produced by various species of fungi are known to affect susceptible people and are related to allergic diseases like asthma and rhinitis. The airborne fungal spores of Tumkur were studied for one year from June 2021 to May 2022 using two stage Andersen Sampler. Totally 26 types, representing mainly major groups – *Cladosporium*, *Alternaria* and *Aspergillus* were identified from the samples. The most widely occurring spores were *Penicillium*, *Nigrospora*, *Helminthosporium*, *Curvularia* and *Ascospores*. Most of the dry spores showed maximum concentration in monsoon season and *ascospores* and *basidiospores* in post-monsoon season. Correlation coefficient studies between the aeroallergens and meteorological parameters were carried out. An attempt has been made to forecast atmospheric fungal spore concentration in Tumkur.

Keywords: Andersen Sampler, Allergens, Fungal Spores, Meteorological parameters

SIII-PP-53

***In Vitro* and *In Vivo* Experiments on Protective Role of Spirulina
against Arsenic Induced Toxicity**

Payel Sarkar, Anupama De, Mahasweta Chatterjee, Jayanta Kumar
Kundu

Genetics and Molecular Biology Lab,
Department of Zoology,
Vidyasagar University, Midnapore, West Bengal
Email: mahasweta03@gmail.com

ABSTRACT

The arsenic toxicity is a common issue in present day world. Continuous increasing level of arsenic in water bodies as well as in foods from different sources, like mining, factory effluents etc. causes severe damage in our biological system. It is not only toxic but also carcinogen in nature causing damages of different organs. The spirulina being a super food has many active compounds showing protective roles against such toxicity. Present study was undertaken to show the *in vitro* and *in vivo* effects of spirulina on arsenic induced toxicity in mammalian body. The experiments showed positive effects after spirulina treatment and proved it as an effective material to be used in future treatment of such kind of toxicity.

Keywords: Toxicity, Arsenic, Mice, Spirulina, Carcinogen, SOD, DPPH

ZnO nanoparticle synthesis, characterization, dye degradation and biological studies on *Hardwickia binata* leaf extract

Peraman Manimegalai, Kuppusamy Selvam
Department of Botany,
School of Life Sciences, Periyar University,
Salem, Tamil Nadu, India.
Email: selsarat@yahoo.com

ABSTRACT

The green nanoparticles (NPs) have attracted significant research attention for its inborn properties. Here, *Hardwickia binata* leaves extract using synthesis zinc acetate NP was confirmed by colour change in green to pale white precipitate. ZnO-NPs were evaluated using a UV-Vis spectrophotometer (UV) at 365 nm confirms the synthesis of Hb-ZnO NPs. FTIR analysis was able to demonstrate the existence of several functional groups like carboxylic acids, amine, anhydrides and alcohol. XRD findings support ZnO-NPs as crystalline structure. SEM data confirmed their synthesis ZnO NPs as spherical in shape. According to TEM findings, particles with a size range 25 nm and spherical shaped structures. *Staphylococcus aureus* (13 mm) shows high inhibition compared to other bacterial strains. Antioxidant shows DPPH (59.83%), ABTS (55.43%), hydroxyl radical (55.86) and albumin denaturation (63.48 %), HRBC membrane stabilization (64.79%). Human cancer A431 cell line was treated with 65% of inhibition and HepG2 with 66.86% of inhibition to evaluate the cytotoxicity of synthesised ZnO-NPs. These findings it should be noted that synthesis NPs can be utilized for a variety of global biomedical applications in the future.

Keywords: Characterization, Antibacterial, Antioxidant, Anti-inflammatory, Anti-proliferative.

Molecular characterization of beneficial microbes associated with *Dendrocalamus strictus* (Roxb.) Nees and *Ailanthus excelsa* Roxb. from degraded land

Poonam Bhanse^{ab}, Lal Singh^{ab}, Asifa Qureshi^{ab*}

^aEnvironmental Biotechnology and Genomics Division, National Environmental Engineering Research Institute, Nehru Marg, Nagpur, India,

^bAcademy of Scientific and Innovative Research (AcSIR), Ghaziabad, India

* Email: a_qureshi@neeri.res.in

ABSTRACT

The purpose of the study was to isolate and characterise beneficial microbes associated with commercial plants *Dendrocalamus strictus* (Roxb.) Nees (Bamboo sp.) and *Ailanthus excelsa* Roxb from degraded land. Six bacterial isolates namely YKDR-11, YKAR-1, JBANR-1, JKANR-2, JBAR-3 and YKDR-10 were obtained from rhizospheric as well as non-rhizospheric soil of the plant species. In the in vitro assays, isolates were able to solubilize potassium, nitrogen fixing ability, ACC deaminase activity and citrate utilization activity, while four isolates i.e., YKDR-11, JKANR-2, JBAR-3 and YKDR-10 was able to solubilize phosphate. Further investigation of JBANR-1, JBAR-3 and YKDR-10 by 16S (V3-V4) Sanger's sequencing were identified as *Burkholderia contaminans* PB_AQ24 (Ac. no: OM967238.1), *Pseudomonas aeruginosa* PB_AQ27 (Ac. no. OM967239.1) and *Bacillus subtilis* PB_AQ30 (Ac. no: OM980686.1), respectively. Their utilization may assist in promoting plant growth in degraded soil.

Keywords: Beneficial microbes, Degraded land, Phytoremediation, Bioremediation, Advanced tools and technology

**Antimicrobial Sensitivity Pattern Isolated from Vaginal Swab in
Diagnosis of Vaginal Infection at a Shukla Hospital in Akola,
Maharashtra, India**

Prachi Holkar, Deepali Shukla, Mayuri Mahajan
Department of Gynecology,
Shukla Hospital,
Akola, Tq. and District Akola,
Maharashtra, India
Email: prachiholkar97@gmail.com

ABSTRACT

The vagina contains dozens of microbiological species in variable quantities and is, therefore, considered a complex environment. Among the microorganisms, bacteria have important repercussions on women's health. The present study was conducted to elucidate this type of vaginal microbial isolates and their sensitivity towards currently used antibiotics. This was a retrospective study conducted at the Department of Gynaecology, Shukla Hospital, Gangadhar Plots, Akola, Tq. and District Akola, Maharashtra, India from May 2021 to April 2022. All symptomatic women who had a high vaginal swab taken for culture and sensitivity testing were included in this study. Antibiotic susceptibility was tested using disc diffusion method (modified Kirby-Bauer's method). The antibiotic sensitivity patterns of isolated microorganisms were studied. Out of 55 patients, 96% had positive vaginal cultures. Twelve types of microorganisms were isolated. The highest frequency of infection was seen at the age of 20-30 years, followed by 30-40 years and 40-50 years, and a low frequency of infection was observed above 50 years and below 20 years of age. The most prevalent pathogen was *Escherichia coli*, followed by *Streptococcus agalactiae* and diphtheroids with equal incidence. Among the antibiotics tested, isolated pathogens were completely resistant to Amikacin and highly sensitive to Ampicillin and Meropenem. The high prevalence of gynaecological infections demands that patients with symptoms undergo thorough investigation with cultures and sensitivity essays. Changes in treatment protocols are required to treat vaginal infections effectively.

Keywords: Vaginal Swab, Microorganism, Antibiotic Sensitivity

SIII-PP-57

Efficacy of commonly used decontaminants on bacterial contamination on food garnishes

Pranita B. Gulhane

Department of Microbiology,
S.S.E.S. A's Science College,
Congress Nagar, Nagpur (MS)
Email ID: pranita12@gmail.com

ABSTRACT

Food garnishes are often used in an uncooked form. Hence, the chance of contamination is high. The present research work was carried out to isolate potentially pathogenic and food spoilage causing bacteria from commonly used food garnishes. Six such bacteria were isolated and characterized and antibiotic sensitivity tests were conducted. It was found that it is concluded that the most dominant bacteria on food garnishes was *Pseudomonas aeruginosa* followed by *Escherichia coli*, *Staphylococcus aureus*, *Salmonella sp.*, *Klebsiella sp.*, and *Citrobacter sp.*. The combination of vinegar and salt was found to be more effective against contaminant bacteria isolated from food garnishes.

Keywords: Food garnishes, Bacterial contamination, Decontaminants

Bacteriological profile of Doctor's mobile phone

Pranita Gulhane, Sapna Baghel, Harsha Poddar, Mansi Bramhankar
Department of Microbiology S. S. E. S. A's Science College,
Congress Nagar, Nagpur (MS)
Email ID: pranita12@gmail.com

ABSTRACT

Mobile phones are frequently used by Doctors which can harbor potential bacterial pathogens and can become an exogenous source of nosocomial infection. The present study was conducted to analyze bacterial pathogens on doctor's mobile phones. Total 39 samples were collected in which 30 mobile phones were contaminated with the presence of *Pseudomonas aeruginosa*, *Proteus vulgaris*, *Escherichia coli*, *Klebsiella pneumoniae* and *S.aureus*. The study demonstrates that mobile phones can act as a potential source to spread infection

Keywords: Doctor's Mobile phone, Bacteria

Green synthesis, characterization and evaluation of antibacterial and dye degradation potential of iron oxide nanoparticles

Praveena L and Saranya R. S.
Department of Biotechnology,
Rathnavel Subramaniam College of Arts and Science,
Coimbatore, Tamil Nadu, India.
Email: manonmanisathee12@gmail.com

ABSTRACT

Nanotechnology is the most upcoming field of science and technology in the recent years. Scientists are constantly in search of discovering new and innovative techniques in order to develop cost effective methods to deal with environmental as well as human health related problems. Metallic nanoparticles are currently a hotspot of interdisciplinary research due to their inherent potential for diverse nanotechnological applications. Iron oxide nanoparticles have attracted considerable interest due to their superparamagnetic properties and their potential biomedical applications arising from its biocompatibility and non-toxicity. Its production and usage are growing exponentially due to its wide applications in different fields of science and technology. The aim of this study is to synthesize iron oxide nanoparticles, characterization, determining its antibacterial activity and verifying its capacity of dye degradation. From the conventional chemical and physical methods of synthesis of nanoparticles, the focus is shifted to more sound and safer biological route of nanoparticles production. Microorganism based methods have been advantageous to some extent, however scaling up of nanoparticles for commercialization has become an exhaustive challenge. The plant mediated synthesis of nanoparticles have huge potential and diverse applications ranging from biomedicine to environmental remediation. Thus the iron oxide nanoparticles were synthesized from *Murraya koenigii* leaves by green synthesis method. Green synthesis method is an emerging area in the field of nanotechnology which is used as an alternative for physical and chemical method. This method is used to avoid producing unwanted harmful by-products which affect the environment. The iron oxide nanoparticles which are synthesized by this technique are highly safe, non-toxic and environmental friendly in nature. The green synthesized iron oxide nanoparticles was confirmed by systemic characterization using FE-SEM, EDX studies which provides the morphology and elemental composition of nanoparticles. As an application part, the antibacterial activity of iron oxide nanoparticles was

evaluated against the microorganisms *Pseudomonas aeruginosa* (gram negative) and *Bacillus subtilis* (gram positive) bacteria by well agar diffusion method. Zone of inhibition testing is a fast and qualitative means to measure the ability of an antimicrobial agent to inhibit the growth of microorganisms. Iron oxide nanoparticles showed higher antibacterial activity against *Bacillus subtilis* comparative to *Pseudomonas aeruginosa*. The photocatalytic ability of the synthesized iron oxide nanoparticles was demonstrated by degrading the methylene blue dye under sunlight. Photocatalysis using metal oxides have potential applications in both environment and organic synthesis. The removal efficiency of methyl blue dye with the Green synthesis, characterization and evaluation of antibacterial and dye degradation potential of iron oxide nanoparticles 3 synthesized iron oxide nanoparticles was carried out with different concentrations of iron oxide nanoparticles under sunlight at different intervals. The decolouration of the dye indicates that the iron oxide nanoparticles can be used efficiently bioremediation of wastewater from industrial and domestic sources.

Keywords: Green synthesis, antibacterial, dye degradation, nanoparticles, photocatalysis.

SIII-PP-60

Antibacterial activity of *Syzygium cumini* seeds and derived silver nanoparticles

Pritee Wagh, Dhanashree Rajderkar and Sarika Bhalerao*

Department of Biotechnology, Ramaji Pandav College ,Nagpur

*Department of Plant Biotechnology, Vilasrao Deshmukh college of Agricultural Biotechnology (VNMKV), Latur

Email: pritechimote79@gmail.com

ABSTRACT

The property of the silver nanoparticles having the antimicrobial activity drags the major attention towards the present nanotechnology. *Syzygium cumini* is used as medical plant to cure many diseases. The environmentally nontoxic, eco-friendly, and cost-effective method that has been developed for the synthesis of silver nanoparticles using plant extracts creates the major research interest in the field of nanobiotechnology. *Syzygiumcumini* is used as reducing agent in synthesis of silver nanoparticles. It was found that the silver nanoparticles have antibacterial activity against *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Klebsiella pneumoniae*. *Syzygium cumini* AgNPs is a potential antibacterial agent.

Keywords: Antimicrobial activity, silver nanoparticles, *Syzygium cumini* seeds

Impact of paraquat on developmental toxicity in *Drosophila melanogaster*

Prithvi S. R. and B. P. Harini
Department of Zoology,
Bangalore University,
Jnanabharathi Campus,
Bengaluru, Karnataka, India
Email:bpharini@gmail.com

ABSTRACT

Paraquat (PQ), a quaternary nitrogen herbicide, is commonly used as a pesticide despite of its high toxicity. Our study evaluated the effect of subchronic PQ exposure on the Developmental toxicity in *Drosophila melanogaster*. The aim of Developmental toxicology is to detect any adverse effects of xenobiotics on the pregnant female and on the development of the embryo and fetus as a consequence to exposure from starting with implantation through the entire period of development. *Drosophila* has been proposed as a useful, rapid, and economical model in the preliminary screening for teratology studies. The increased exposure of this herbicide may lead to high neurological effects like Developmental delay, reduced locomotor activity, morphological anomalies, paralysis and even It may alter the content of neurotransmitters. This study reveals that on exposure to Paraquat (PQ), larvae and pre-adult stages are prone to developmental toxicity.

Keywords: *Drosophila melanogaster*, paraquat (PQ), herbicide, Developmental toxicity.

**Bioremediation: use of generally recognised as safe bacterial blend
to clean up fish ponds**

Purohit, P*¹, D. Harwani², A. M. Chandak³ & S. A. Mankar³

¹PGTD of Microbiology, RTMNU, LIT Campus, Nagpur.

²Maharaja Ganga Singh University, Bikaner.

³D. R. B Sindhu Mahavidyalaya, Nagpur.

*Email: prachi.purohit23@gmail.com

ABSTRACT

The main accumulated waste in fish pond is fish excretion which is one of the serious aquatic and human health risks. In this study, a total of 30 nitrifying bacterial strains were isolated from lake water by pour plate technique using a self designed medium supplemented with ammonia. Out of 30 isolates, a few showed highest ammonia utilization, therefore were selected for further study. Phylogenetic analysis of the 16 s rDNA sequence was carried out. Because of high ammonia utilising efficiency, selected isolates could be a potential tool for bioremediation of fish pond to protect aquatic environment.

Keywords: Nitrifying Bacteria, Ammonia, 16 s rDNA, Bioremediation.

**Chlorpyrifos degradation potential of *Pseudomonas aeruginosa*
RNC-3 isolated from cotton soil**

Rahul S. Bhende, Nishant A. Dafale *
Environmental Biotechnology and Genomics Division, CSIR-
National Environmental Engineering Research Institute
(NEERI), Nagpur, India
Email: rahulbhende333@gmail.com

ABSTRACT

Chlorpyrifos is a commonly used pesticide in agriculture belonging to the persistent organophosphate group. This study evaluates the chlorpyrifos degradation potential of *Pseudomonas aeruginosa* RNC-3 isolated from cotton soil. Among 20 bacterial isolates, six bacterial strains were selected on the basis of high rates of chlorpyrifos degradation, and RAPD profiling was performed for the selection of distinct isolates. The most potent chlorpyrifos-degrading bacteria was identified to be *Pseudomonas aeruginosa* RNC-3 by 16s rRNA gene sequencing, showing a degradation rate of 0.684 ppm/hrs. It was observed that 82% of 100 ppm chlorpyrifos was degraded within 5 days by the selected strain. *Pseudomonas aeruginosa* RNC-3 can be used for bioremediation of chlorpyrifos-contaminated sites.

Keywords: Organophosphate, Chlorpyrifos, Biodegradation, Cotton soil

SIII-PP-64

**Use of Divinyl sulfone as an affinity linker for the purification of
Meizotropis buteiformis lectin**

Rana Kamei¹, Oinam Sangita Devi¹, Ch. Bimola Devi², Senjam Sunil Singh^{1*}

¹Biochemistry Department, Manipur University, Canchipur, Imphal, India

²Department of Chemistry, Imphal College, Manipur

*Email: sunil_senjam@rediffmail.com

ABSTRACT

Lectins are carbohydrate-binding proteins found ubiquitously in all organisms. For lectin affinity purification, a sugar ligand is covalently attached to a carrier matrix using Divinyl sulfone as specific linker. The resultant vinyl groups show extreme reactivity towards hydroxyl groups of the ligand and coupling occurs at comparatively lower pH (10-11) and temperature (25°C). An optimum condition for coupling Divinyl sulfone to Sepharose 4B and conjugating ligand lactose is developed by considering the specificity of the lectin and its successful binding. With this method a novel D-galactose-binding lectin was purified from *Meizotropis buteiformis* to its homogeneity.

Keywords: Linkers, Affinity chromatography, Divinyl sulfone, Lectin, Ligands, Matrix

Microbe-loaded bone biochar for plant growth promotion and Phyto-stabilization under heavy metal stress

Rashi, J¹, Mohammed Safvan P¹, Parimala Gnana Soundari Arockiam Jeyasundar^{1*}

¹Department of Biotechnology, RathnaVel Subramaniam College of Arts and Science,
Sulur, Coimbatore, India
Email: apgs_1981@yahoo.co.in

ABSTRACT

Recent years directly acknowledge the changeover of once agricultural soil into barren lands due to various anthropogenic activities as well as subsequent introduction of heavy metals and persistent chemicals leading to production demands. On the other hand, generation of bulk organic waste and improper management adds up to the economic losses in many developing countries including India. Biochar is a charcoal like material generated using the organic wastes can effectively enhance the soil fertility in turn supporting plant yield and agriculture as well immobilize most of the toxic trace metals preventing their entry into food chain. Considering the waste management and Phyto stabilization of heavy metals, our study directly assessed the microbe loaded bone biochar in aiding the plant growth (Maize) as well as Phyto stabilization of heavy metals in industrially polluted soils through the pot experimentations. The plant growth promoting bacteria isolated from the industrial soil samples were screened for the plant growth promotion using the Auxins (IAA), phosphate solubilization and exopolysaccharides. Our results revealed that the bacteria-loaded bone biochar (*Bacillus sp.*) enhanced the root and shoot biomass, plant pigments and growth of Maize plant. The heavy metal in the plant biomass also significantly ($P \leq 0.05$) reduced when compared to control plants. Further field trials may help to understand the long-term effects of the bacteria-loaded biochar on polluted soil remediation and agricultural productivity.

Key words: Bone biochar, Plant growth, Bacteria, Agriculture, Heavy metal, Pollution

Nano-formulated Naringenin Ameliorate Aluminum Nanoparticles-induced Hepato-nephro Toxicity in Albino Male Mice

Ravina Rai

Dr Harisingh Gour Central University,
Sagar, M.P., India
Email: ravinarai35@gmail.com

ABSTRACT

Aluminium nanoparticle (Al-NPs) acts as environmental toxic substance, causes hepato-nephro toxicity. Researchers suggest that naringenin (NAR) have a strong antioxidant and anti-inflammatory properties. However, the detailed aspects of hepato-nephroprotective potential of nano-formulated naringenin (NAR-NPs) against Al-NP-induced hepato-nephrotoxicity and their mechanism of action is still unknown. Here, we studied the hepato-nephroprotective efficacy of NAR-NPs on Al-NPs-induced oxidative stress, cytokines secretion in mice with special emphasis on the histopathology liver and kidney. Our result suggest that Al-NPs treatment significantly increase the level of oxidative stress and inflammatory cytokines; whereas co-administration of NAR-NPs maintain oxidative stress, cytokines secretion and histopathological alteration.

Keywords: Aluminium nanoparticles, naringenin nanoparticles, oxidative stress, anti-oxidant system, hepatotoxicity and nephrotoxicity.

In vitro study of antibacterial activity of ethanolic *Adhatoda vasica* leaf extracts against drug resistant fish bacteria

Reena Mol S

Department of Biotechnology,
Sree Narayana Arts and Science College ,
Kumarakom, Kottayam, Kerala.
Email:reensprav@gmail.com

ABSTRACT

The medicinal plant, *Adhatoda vasica* was collected from Western Ghats, India and was finely powdered. The phytochemical compounds such as, *tannin, alkaloids, steroids, phenols, proteins and amino acid* were determined in the ethanol extract of *A. vasica*. Antioxidant activity of the leaf extract was tested by four different methods such as, DPPH scavenging, nitric oxide radical scavenging, superoxide radical scavenging, and hydroxyl radical scavenging activities. The leaf extract showed potential DPPH scavenging and nitric oxide radical scavenging activities. The leaf extract showed antibacterial activity against fish pathogens such as, *Aeromonas hydrophila, Flavobacterium columnare* and *Streptococcus agalactiae*. Antibacterial activity was maximum against Gram-negative bacteria. Ethanolic leaf extract of *A. vasica* showed maximum activity against *A. hydrophila* and *S. agalactiae*. The ethanolic extract of *A. vasica* could be an alternate to synthetic novel antimicrobial agents to treat bacterial infections in aquatic organisms.

Keywords: Fish pathogens; bacteria; medicinal plants; phytochemicals

**Mechanism of Antibiotic Resistance of Bateria and Action of
Phytochemicals toBypass the Mechanisms**

Renuka Vyawahare, Chaitanya Bobde, Himanshu Pachare*, Mokshada
Balaskar,
Anushka Deogirkar

¹Department of Molecular Biology and Genetic Engineering, RTM Nagpur
University,
Nagpur, Maharashtra, India.

*Email: 1304himanshupachare@gmail.com

ABSTRACT

Antibiotic resistance in bacteria is a major concern worldwide. The gradual evolution of bacteria to overcome the harms associated with antibiotics has led difficulty in treatment of various bacterial diseases and infection globally. There are various ways through which the antibiotic resistance is acquired. The bacteria possess various antibiotic resistant plasmids which are transferred by horizontal gene transfer, mechanisms like cells efflux pumps flush the antibiotics out of the cells, the inactivation of antibiotic via enzymes, modification of antibiotic target site by bacterial cell and reduction of cell permeability towards the antibiotic are continuously evolving which makes this a serious threat to our health. The antimicrobial properties of plants can be used to treat, kill or inhibit the growth of microorganisms. The proper understanding of antibiotic resistance mechanism in the bacteria and mechanism of action of particular plant phytochemicals, can lead a way to bypass the antibiotic resistance. The combination of antibiotics and their synergistic effect with plant phytochemical can also be studied and applied effectively to overcome the global crisis.

Keywords: Antibiotic resistance, Phytochemicals, Mechanisms of Resistance.

Mass spectrometry based proteomic profiling workflow for blood plasma protein quantification

Riddhi Chakraborty, Arijit Pal, Anjali Gupta, Arvind Korwar

Department of Microbiology, St Xavier's College (Autonomous), Kolkata
Thermo Fisher Scientific India Pvt Ltd,
Proteomic Laboratory National Institute of Biomedical Genomics, Kalyani
Email: ridchak2001@gmail.com

ABSTRACT

Blood plasma is comparatively the most complex proteome of all biological fluids with higher dynamic range of proteome composition. However, it also provides a modest non-invasive method for early diagnosis of diseases. The plasma harbours a plethora of proteins that may be differentially expressed during pathophysiological conditions but are mostly in extreme low abundances in comparison with albumin, immunoglobulins, fibrinogen, transferrin, and other abundant housekeeping proteins, thus making detection, identification, and quantification challenging unless the high abundant proteins are depleted from the plasma. This can be achieved using commercial plasma depletion kits that use affinity probes that selectively bind to albumin and immunoglobulin, allowing the relative abundance of those low abundant proteins to increase in the complex mixture. Among various depletion kits available, albumin and IgG depletion kit was used in this study. The purpose of this study was to use a depletion kit to deplete plasma and compare the proteins identified in the undepleted and depleted plasma samples. The kit used here was Bio-Rad Aurum™ Serum Protein Mini Kit (catalog: 732-6701). Though the kit had mentioned that the eluate was compatible with two-dimensional gel electrophoresis, a number of strategies were employed in order to obtain a decent number of proteins identified from the depleted sample using liquid chromatography tandem mass spectrometry (LC-MS/MS). However, it was found that the resultant depleted sample from the kit was not compatible with the downstream processing of LC-MS/MS analysis, hence desirable results could not be obtained. Approximation of depletion efficiency with other available kits is yet to be conducted as a future perspective that would facilitate the plasma proteomics-based biomarker discovery in various pathophysiological conditions. This study

was a part of development of standard operating protocol (SOP) in the young Proteomics Laboratory at National Institute of Biomedical Genomics (NIBMG), Kalyani.

Keywords: Blood plasma, depletion, LC-MS/MS

SIII-PP-70

Bio-prospecting the role of yeasts inherent in fermentative cakes and banana peels in the production of IAA and ethanol content in fermented fruit pulp materials and mushroom.

Riki Talukdar, Himangshu Sarma, Bhaskar Jyoti Nath and Hridip Kumar Sarma*

Microbial Communication and Fungal Biology Group, Department of Biotechnology, Gauhati University, Guwahati, Assam, India.

* E-mail: hridip@gauhati.ac.in

ABSTRACT

Yeasts are ubiquitous unicellular microorganism involve in alcoholic fermentation and production of other secondary metabolites including indole-3-acetic acid (IAA). IAA being a growth promoting phytohormone plays important role in various aspects of plant growth and development including yield. In present study yeasts were isolated from traditional fermented cakes and *Musa balbisiana* fruit followed by fermentation of raw substrates for the production of IAA and ethanol. Highest IAA yield was observed in oyster mushroom as substrate, while, ethanol content was found to be highest in banana peel fermentation.

Keywords: Fermentation IAA, Ethanol, *Musa balbisiana*, *Pleurotus ostreatus*, Jackfruit, *Candida tropicalis*, *Wickerhamomyces anomalus*, *Candida glabrata*

Baicalin provides protection against fluoxetine-induced hepatotoxicity by modulation of oxidative stress and inflammation

Risha Ganguly, Ramesh Kumar, Abhay K Pandey
Department of Biochemistry,
University of Allahabad, Prayagraj, India
Email: rishaganguly53@gmail.com

ABSTRACT

Fluoxetine is one of most widely prescribed anti-depressant drugs belonging to the category of selective serotonin reuptake inhibitors. However, several hepatotoxic effects of fluoxetine treatment have also been reported. Baicalin is a natural compound obtained from the Chinese herb *Scutellaria baicalensis*. The antioxidant and hepatoprotective effects of baicalin are well studied. However, the beneficial effects of baicalin against fluoxetine induced hepatic damage have not been reported. In this study, the protective action of baicalin in fluoxetine-induced liver toxicity and inflammation was evaluated. The metabolism of fluoxetine leads to the formation of free radicals that consequently causes liver damage and inflammation. Oral administration of fluoxetine at 10mg/kg body weight for 28 days resulted in elevated levels of the serum liver function markers (total bilirubin, ALT, AST, and ALP) and inflammatory markers (TNF- α , IL-6, IL-10 and IFN- γ), with a decline in total protein and albumin levels. Biochemical markers of oxidative stress such as SOD, CAT, GST, GSH, MDA and AOPP in the liver tissue homogenate were also altered indicating a surge in reactive oxygen species leading to oxidative damage. Histological examination of liver tissue also showed degeneration of hepatocytes. Concurrent administration of baicalin (50 and 100 mg/kg) restored the biomarkers of oxidative stress, inflammation and hepatic damage in serum as well as in liver tissues to near normal levels. These findings suggested that long-term treatment with fluoxetine leads to oxidative stress *via* the formation of free radicals that consequently cause inflammation and liver damage. Concurrent treatment with baicalin alleviated fluoxetine-induced hepatotoxicity and liver injury by regulating oxidative stress and inflammation.

Keywords: Fluoxetine; Hepatotoxicity; Oxidative stress; Baicalin; Anti-inflammatory; Hepatoprotective and antioxidant

Comparison of the efficacy of isoprene from different sources and its anti-microbial properties

Sagnik Das, Dyutishmita Bhattacharjee, Debdeep Chattopadhyay, Arijit Halder

Department of Microbiology,
St. Xavier's College (Autonomous), Kolkata
Email: sagnikd525@gmail.com

ABSTRACT

Isoprenes are the main components of essential oils. Study confirmed that isoprene is produced by Rhodobactersphaeroides. An air-sharing culture system was developed where different bacterial cultures aseptically shared the same atmospheric conditions to evaluate the effect of volatile isoprene. Their effects were tested on both Gram positive and Gram negative bacteria. They had antimicrobial properties and were more effective on Gram positive bacteria compared to Gram negative bacteria. Their microstructures were also studied by FE-SEM (Field Emission Scanning Electron Microscopy). Those images showed that isoprene has the antimicrobial activity mechanism. The endophytic fungus was isolated from the leaves of Coleus amboinicus Lour and was identified to be Atheliarolsii. The compound was purified by Preparative Thin Layer Chromatography. Antimicrobial activities were determined by measuring IC₅₀ and MBC (Minimum Bactericidal Concentration) values against Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa, Bacillus subtilis, Salmonella typhi and Staphylococcus mutants. They showed antimicrobial properties with IC₅₀ and MBC of some specific value proving that they produced antimicrobial agents. Apart from microbial sources, isoprene can be obtained from petroleum, isobutene and formaldehyde but they increase the chances of chemical pollution.

Keywords: Isoprene, Rhodobactersphaeroides FE-SEM, Coleus amboinicus, Atheliarolsii

SIII-PP-73

Biochemical and Histomorphological Characterization of Parotid Gland in *Duttaphrynus melanostictus* From Different Habitat

Sandhya Maji, Payel Sarkar, Mahasweta Chatterjee, Jayanta Kumar Kundu

Genetics and Molecular Biology Lab, Department of Zoology, Vidyasagar University, Midnapore, West Bengal
Email: mahasweta03@gmail.com

ABSTRACT

The defensive mechanism of amphibians includes special glandular structures on their body which contains mucous or poisonous substances commonly used to fight against predators. In venomous animals, the venom-producing glands usually have well-defined lumen, where the secretion accumulates after traversing the secretory epithelium cell membrane. In contrast, in anuran amphibians, the poison glands are formed by a single multinucleated cytoplasmic mass, constituting a secretory syncytium. It may be some bead like structures on skin, called warts or a collective mixture of glands in a specific region, known as macrogland or parotid. The present study was designed to characterize biochemically and histo-morphometrically the parotid glands of common Indian toad from two different habitats of West Bengal.

Keywords: Predators, Parotid, Macrogland, Defense, Poison, Amphibian, Anuran

Microbial profiling of street foods available at different locations

Sandhya Tambekar Wanjari

Department of Microbiology,
Dhote Bandhu Science College,
Gondia, Maharashtra

Email: sandhyatambekar@rediffmail.com

ABSTRACT

"Street foods" are described as a wide range of ready-to-eat foods prepared in public places, notably streets. Foods and beverages which are prepared and sold by the sellers on places like streets, and festival areas, and consumed by the consumers on the run are known as street food. These foods are alternatives to homemade food and are more affordable when compared with the food supplied at restaurants. The final preparation of street foods occurs when the customer orders the meal which can be consumed where it is purchased or taken. The present study aims to establish the hygienic status of street vended food and its impact. It is recommended that bring your own/homemade food, choose a clean and hygienic place (hotel, restaurant, vendor) for having street food, avoid street food in the rainy season or choose a safe place only, Venders must adopt good handling practices, Local government or the respective authorities must check the quality of street food from time to time and warn vendors to maintain it.

Keywords: Street vended foods, microbiological quality, hygienic practices, bacterialcontamination, food safety

SIII-PP-75

**Biochemical components in freshwater Bivalve molluscs,
*Lamellidens corrianus***

Sangeeta Dongre, Priyanka Shejwal, Suhasini Gadekar
Department of zoology Government College of arts and Science
Aurangabad Maharashtra Email: sangeetadongre24@gmail.com

ABSTRACT

Biochemical composition in *Lamelliden corrianus*, the freshwater species collected from Nanadrabad Pond near Khultabad, Aurangabad district, varied seasonally. An inversely correlation with the protein and lipid constituents was observed during the summer and winter season. The fluctuation in biochemical content might be due to the impact on the endogenous and exogenous factors and the triggering role of cerebral ganglion ablation.

Keywords: Biochemical, *Lamelliden corrianus*, Cerebralectomy, Protein and lipid content.

Dissolution of silk fibroin protein from the cocoon of *Antheraea frithi* Moore for potential biomaterial application

Sanasam Yaiphabi, L. Rupachandra Singh and S. Kunjeshwori Devi.*

Department of Biochemistry,
Manipur University, Canchipur,
Imphal, Manipur India

*Email: kdsanjenbam@yahoo.com

ABSTRACT

Silk fibroin is a high molecular weight fibrous protein polymer. Extraction of fibroin protein from the cocoon of *Antheraea frithi* was carried out by performing sequential steps of demineralization, degumming, and dissolution. The dissolution of silk fibers is the key step for the application of silk protein-based materials. Dissolution was carried out in calcium nitrate solution with varying dissolving conditions. The optimum conditions of dissolution were found as 7M calcium nitrate, 120°C and 6h dissolving time. Surface characterization and mineral content of silk fibroin fibers were also analyzed using SEM and EDAX.

Keywords: *Antheraea frithi* moore, Silk fibroin, Biomaterial, Demineralization, Degumming, Dissolution

Comparative Study of Efficacy of 2-fluoro-1,3,2 -dioxaphospholane and 2-choloro-1,3,2 -dioxaphospholane on Microbial Production of Lactic Acid by Lactobacillus Plantarum NCIM-1296

Sanjay Kumar Srivastava

Department Of Chemistry,
S.G.G.S. College, Patna City Patna, Bihar (India)

Email: drsanjaykrsrivastava@yahoo.com

ABSTRACT

Lactic acid i. e. 2-hydroxypropionic acid is a naturally occurring organic acid which can be used in a variety of industries e. g. food & beverages, chemical, cosmetics, textiles, pharmaceutical and in the medical industries. The demand of lactic acid has increased considerably in recent years. Today it is also used in production of biodegradable & biocompatible PLA polymers solvents and oxygenated chemicals. Lactic acid can be produced by fermentation. Production by the fermentation process has attracted interest because of its advantages in the production of pure isomers of lactic acid, use of recyclable and low cost raw materials. For biosynthesis mutagens are used to increase the frequency of mutations. In this work the efficacy of 2-fluoro-1,3,2 dioxaphospholane and 2-choloro-1,3,2 -dioxaphospholane on microbial production of lactic acid by lactobacillus plantarum NCIM-1296 have been calculated. It was found that Mutagen i. e. 2-choloro-1,3,2 dioxaphospholane is active at the molar concentration $8 \times 10^{-5} \text{ M}$ and enhances the production of lactic acid extent to **13.415%** higher in comparison to control fermentor. At higher concentration it inhibits the production of lactic acid. It is also found that mutagen 2-fluoro-1,3,2-dioxaphospholane at concentration $7 \times 10^{-5} \text{ M}$ enhance the production of lactic acid to the extent of **9.627%** in comparision to control and at higher concentration it inhibits the production of lactic acid to a great extent.

Keywords: Lactic acid, 2-fluoro-1,3,2 -dioxaphospholane and 2-choloro-1,3,2 -dioxaphospholane, lactobacillus plantarum NCIM-1296.

SIII-PP-78

Elastase, collagenase, and hyaluronidase inhibitory activities of sericin extracted from cocoon shell of *Antheraea proylei* J.

Sanjenbam Kabita, L.Rupachandra Singh, S.Kunjeshwori Devi
Laboratory of Protein Biochemistry,
Biochemistry Department, Manipur University,
Canchipur Imphal, Manipur India
Email: kdsanjenbam@yahoo.com

ABSTRACT

Sericin and fibroin are the silk proteins which make the silkworm cocoon. Sericin extracts from mulberry (*Bombyx mori* L.) cocoon were found to have many biological activities like antioxidant, anti-cancer, anti-tyrosinase, moisturizing and wound healing properties. In the present investigation, inhibitory activities of sericin extracts from the non-mulberry oak tasar (*Antheraea proylei* J.) cocoon towards elastase, collagenase, and hyaluronidase were determined. All these three enzymes have been reported to play key roles in skin ageing phenomenon. The elastase, collagenase and hyaluronidase were inhibited by the sericin extracts at IC₅₀ range of 1.99-5.28, 2.51-13.0 and 3.33-3.72 mg/mL, respectively. Therefore, the sericin extracts from the oak tasar cocoon may find applications in pharmaceutical and cosmetic industries.

Keywords: *Antheraea proylei* J., elastase, collagenase, hyaluronidase, sericin, skin ageing

SIII-PP-79

Analysis of genetic diversity of *Fusarium udum* causing wilt in Pigeon pea using RAPD marker

Sarika RavindraBhalerao, Akash Anand Bansod, Pritee Prabhakarrrao
Wagh

Vilasrao Deshmukh College of Agricultural Biotechnology,
V.N.M.K.V., Latur

VilasRamajiPandav College, Nagpur

Email: sarikasshende@gmail.com

ABSTRACT

Fusarium wilt caused by *Fusarium udum* is a serious soil borne disease of pigeon pea causing tremendous yield losses every year. *F. udum* was isolated from infected samples of pigeon pea from different regions of Maharashtra and determined the genetic diversity. Five RAPD markers OPA-2, OPA-15, OPB-14, OPF-12 and OPQ-05 was used to analyzed genetic diversity. A total of 61 amplicons were generated of which 53 were polymorphic. The polymorphism showed by RAPD marker was 85.86%. The cluster I comprised isolates FU-01 (Latur) and FU-06 (Jalna) showed 65% similarity to each other. However FU-02 (Jalgaon) showed 51% similarity with remaining isolates.

Keywords: Pigeon pea, *Fusarium udum*, Genetic diversity, RAPD

Antioxidant potential of cyanobacteria isolated from Chandipur coast, Odisha

Satyabrata Dash and Biswajit Rath*
Department of Biotechnology,
Maharaja Sriram Chandra Bhanja Deo University,
Sriram Chandra Vihar,
Takatpur, Baripada, Odisha, India.
Email: satya9132@gmail.com

ABSTRACT

In recent time usage of marine cyanobacteria as potential alternative source of antioxidant compounds is gaining interest. This study aimed to characterize the antioxidant profile of cyanobacteria (*Phormidium molle* and *Phormidium tenue*) in terms of their radical scavenging and reducing power activity. The results revealed that both the species has differential elevated antioxidant activity. However, the Flavonoid and Phenolic content was higher in *P. molle* than *P. tenue*. Further, the results of enzymatic assay also supported and confirmed for antioxidant activity among the species. Thus extending the work on isolating such novel metabolites will be an excellent source of alternative low cost antioxidant therapeutic compound.

Keywords: ABTS, catalase, DPPH, TPC, TFC and SOD

**Bacterial load Determination using TaqMan PCR Approach:
Standardization and Evaluation**

Sharda P. Bhagchandani and Damini R. Motwani
Dada Ramchand Bakhru Sindhu Mahavidyalaya,
Nagpur, Maharashtra, India.
Email: sharda.spforever@gmail.com

ABSTRACT

Present work is aimed to develop a rapid, accurate and reliable universal 16S rDNA quantitative real time TaqMan PCR assay determining bacterial load in the clinical samples of infectious diseases. Universal bacterial 16S rDNA was targeted for primers and TaqMan hydrolysis probe designing. The PCR conditions were standardized using *Pseudomonas aeruginosa* DNA. The standardized PCR conditions thus obtained were first evaluated with spiked samples and later clinical sample evaluation was done taking CSF samples and blood samples. Being quantitative assay, the cut-off value was found to be 212.75pg of DNA through ROC curve while clinical sensitivity and specificity were 87.5% and 93.3% respectively.

Keywords: Quantitative Real Time PCR, TaqMan Assay, Universal 16S rDNA

Rhl mediated phenol degradation in *Pseudomonas aeruginosa* P3

^aSheetal Sivankutty, and Jayachadran K^b

^aSree Narayana Arts and Science College, Kumarakom Kottayam, Kerala, India.

^bSchool of Biosciences, Mahatma Gandhi University, Kottayam, Kerala, India.

Email: sheetalmanugk822gmail.com; jayachandrank@mgu.ac.in

ABSTRACT

Gram negative bacteria uses quorum sensing to regulate several gene functions under stressed conditions via the activity of chemical signals, acyl homoserine lactones. The strain used in this study was isolated from stressed soil constantly contaminated by pollutants. Phenol degradation profile of the strain was studied and found that the organism was able to degrade phenol completely within 72 hours. Studies on quorum sensing properties of the strain under phenol stress proved that the strain was able to produce butyryl homoserine lactone at 48 hours through the Rhl gene of *Pseudomonas aeruginosa*. When this Rhl system in *Pseudomonas aeruginosa* gets activated several genes are activated. Rpos is one of them which encodes the σ^{38} , produced during stressed conditions. Here in the present study an attempt is being made to reveal the relation between quorum sensing and phenol degradation.

Keywords: *Pseudomonas aeruginosa*, phenol degradation, quorum sensing

Biocontrol activity of endophytic bacteria associated with medicinal plants of Manipur

Shingmuan, H., Debananda S. Ningthoujam
Microbial Biotechnology Research Laboratory (MBRL),
Department of Biochemistry,
Manipur University,
Canchipur, 795003, (Manipur) India
Email: debananda.ningthoujam@gmail.com

ABSTRACT

Altogether 84 endophytic bacterial isolates were obtained from 2 medicinal plants viz. *Chromolaena odorata* (local name: Tangsam) and *Alpinia nigra* (local name: Aigia). They were screened for antifungal activities against 5 rice fungal pathogens. Of 84 endophytic isolates, 55 showed antifungal activities against one or more fungal test pathogens. Of which, 2 isolates, AgS6 and AgS9, from *Alpinia nigra* exhibited potent antifungal activities against all 5 fungal test pathogens, showing 84% and 78% inhibition against *Curvularia oryzae* and *Rhizotonia solani* respectively. These two isolates are selected for PGP assays on rice. Details of these studies will be presented in this paper.

Keywords: Endophytic bacteria, medicinal plants, *Chromolaena odorata*, *Alpinia nigra*, antifungal activity

**Antimicrobial, Larvicidal activity of *Pseudomonas fluorescens*
against *Spodoptera litura* (Lepidoptera: Noctuidae)**

Shivakumar, M.S., **B. Janani**, R. Durgadevi, SivaniYeswantika
Periyar University
Email: jananibalamurugan1111@gmail.com

ABSTRACT

The antimicrobial and larvicidal activity of *Pseudomonas fluorescens* against *Spodoptera litura* larvae works as a biological controlling agent with low toxicity impact, when compared to chemical and physical pest control method. The species *Spodoptera litura* having vigorous eating habitat at larval stage, thus it damages the leaves of many plants like castor oil plant (*Ricinus communis*), tobacco (*Nicotiana tabacum*), cotton (*Gossypium*), soybean (*Glycine max*), cabbage (*Brassica oleracea* var. capitata), and chickpeas (*Cicer arietinum*), and so far it implies great loss to farmers throughout tropical region like Asia, Australia, etc. we collect the species *Spodoptera litura* from *Ricinus communis* field near omalur, Tamilnadu for our work. Our study uses *Pseudomonas fluorescens* metabolites to check the Bio-efficacy in different concentration with PBS (Phosphate buffer saline solution) to infect *Spodoptera litura* both in oral (Antifeedant) and injection mode. The interaction between the Chitin component present in the exoskeleton of *S.litura* and other compounds with the Chitinase C metabolite and other metabolite of *P. fluorescens* results in the mortality of *S.litura* with respect to different concentrations of Bioassay. This study leads to development of the bio insecticide for the impact of *Spodoptera litura*.

Keywords: *Pseudomonas fluorescens*, *Spodoptera litura*, Bioassay, Biopesticides

**Isolation and Identification of Bioactive compounds from
Pseudomonas fluorescens against *Spodoptera Litura* Larvae
(Lepidoptera; Noctuidae)**

Shivakumar, M.S., Chandru. **M, Jeevitha.** G, Thireka. P
Periyar University
Email: jeevithagovind2001@gmail.com

ABSTRACT

Spodoptera litura is an important agricultural pest distributed of global importance. It causes great damage to crops like maize, tomato, brinjal, castor, groundnut, cabbage, cauliflower and it is widely distributed throughout tropical and temperature Asia, and Australia. *Spodoptera litura* is polyphagous and can damage more than 112 species of plants belonging to 44 families. There are various chemical pesticides which is available against this insect which causes harmful effects to the environment. In this study, we isolate the bacteria *Pseudomonas fluorescens* that used as a biocontrol agent which suppress the plant disease. In those bacteria, we take the crude extract in 48 hours old culture and further they taken to characterization of FTIR and GCMS analysis and also we have performed antifeedant assay, larvicidal assay and antibacterial activity. In this study, we concluded that Chemical characterization of the compounds in the crude extracts through GC – MS analysis and further analysis the structural activity relationship with major insecticide target proteins in insects.

Keywords: *Pseudomonas fluorescens*; *Spodoptera litura*; Larvicidal; antimicrobial

Potential efficacy of bimetallic nanoparticles synthesized from the endophytic fungus *Penicillium citrinum* against *Culex quinquefasciatus* mosquito larvae, and photocatalytic activity

Shivakumar, M.S., **K. Balumahendhiran**, M. Sharmila
Periyar University
Email: balumahendhirank@gmail.com

ABSTRACT

Mosquitos are a vector of various types of pathogenic diseases and it is controlled by using a number of chemical insecticides. Nowadays the insecticide resistance is a major problem for insect control and make a environmental hazards. Due to this problem, future research is required to produce an alternative biocontrol agent to control the mosquitos species. Biological-based nanoformulations of insecticides may serve as an effective alternative biocontrol technique. In present study, efficacy of *Penicillium citrinum* mediated bimetallic NPs were checked against *Culex quinquefasciatus* after 24h, 48h, and 72h exposure. Additionally, we tested their antibacterial and photocatalytic activity. Then the nanoparticles were characterized by UV Spectroscopy, FTIR, XRD, SEM and EDX. This study demonstrated that the lethal effect of mycogenic BMNPs on *Culex quinquefasciatus* larvae. The LC50 and LC90 value of *Penicillium citrinum* mediated bimetallic nanoparticles on *Culex quinquefasciatus* was 1016.51 ppm, 4948.12 ppm for 24 hrs exposure, 184.80 ppm, 718.16 ppm for 48 hrs exposure, and 59.07 ppm and 338.76 ppm 72 hours exposure respectively. The synthesized Cu-Zn NPs have a potential of photocatalytic activity against Acridine orange (21%). These NPs makes it a more suitable for development of new potential eco-friendly insecticides. Field testing is required, prior to control that the commercialized the *Penicillium citrinum* mediated NPs.

Keywords: Mosquitos control, Bimetallic nanoparticles, Cu-Zn, Entophytic fungi, SEM, EDX.

SIII-PP-87

**Eradication & Utilization of Water Hyacinth from Bangalore Lakes
for Value-added Products which Fuels Self-sustainability**

Shruti Awasthi

Department of Life Sciences,
School of Sciences, Garden City University, Bangalore
Email: shruti.awasthi@gardencity.university

ABSTRACT

Bengaluru was once home to over 1,000 lakes, due to rapid urbanization and residential encroachment, less than 300 lakes remain now. The numbers are rapidly shrinking and the lakes that exist are full of pollutants. The major pollutant water hyacinth is considered to be the most noxious weed. The weed has also affected fisheries and fish-related commercial activities, hindered water transportation and decreased the quantity of water supply, and reduced water quality. On the other hand, when looked at from a resource angle, it appears to be a valuable resource with several unique properties. As a result, research activity concerning the control and utilization (phytoremediation) of water hyacinths has boomed up in the last few decades. Once the weed is removed from the polluted place, apparently it can also be utilized for making value added products. The present proposal addresses towards biodegradation of the water weed and also the extraction of certain products. The project also concentrates on the production of vermicompost. The conversion of this problematic weed to value-added chemicals and fuels helps in self-sustainability, especially for developing countries, Though the methods involved are quite risky and shall not be able to eradicate completely, water hyacinth ends up with few value-added products. Every product throws light on the different commercialized ways and encourages different entrepreneurship.

Keywords: Fishkill, Water hyacinth, Industrial effluents, self-sustainability, water quality

**Study on Opportunistic Fungal Infection in Patients Attending OPD
of Hospitals in Jabalpur**

Shruti Sahu^{1,2}, S.R. Nawange¹, Jitendra Nawange¹, Nidhi Narula²,
Varsha Aglawe³

¹Center For Medical Mycology Fungal Disease Diagnostic and Research
Center, Jabalpur (M.P.)

²Mata Gujri Mahila Mahavidhyalaya Jabalpur (M.P.)

³Govt. Science Autonomous College, Jabalpur (M.P.)

Email: shrutisahu.19047@gmail.com

ABSTRACT

The study of fungi is pathogenic to humans is called "medical mycology". A biologist specializing in mycology is called a mycologist. Many fungi produce toxins antibiotics in other secondary metabolites. "Medical mycology" is a study of my causes of men and their etiological agents and my causes are disease caused by fungi. Mycologist recognized about 200 species of fungi among one lakh species of fungi as primary pathogen of man and animals fungi constitutes a group of non-motile Eukaryotic organism that have define cell wall, are devoid of chlorophyll and reproduce by means of spore. Immunosuppressed means the person or patient have weaker immunity or immune system and already suffering from primary infection or disease that can be AIDS, cancer, Tb, diabetes and so on for diagnosis of secondary infection in patients along with serological test fungal diagnosis should also be done. This field of science deals with the causative agents of infectious disease of man, his reaction to them and the methods of protection against such disease. Disease and death have always attracted the attention of human mind.

Keywords: Opportunistic fungi, Immunosuppression, Secondary infection.

**Biopotential Lichens from Maharaja Sriram Chandra Bhanja Deo
University, Odisha**

Shubham Pradhan and Biswajit Rath*

Department of Biotechnology, Maharaja Sriram Chandra Bhanja Deo
University

Baripada, Odisha, India

Email: shubham9668518446@gmail.com

ABSTRACT

Lichens are unique symbiotic cryptogamic flora with an excellent source of novel metabolites with prominent bioactivity. The antioxidant activity in terms of DPPH and FRAP of Lichen, *Trypethellium virens* and *Phaeographis dendritica*, was studied using different organic solvents. The antimicrobial activity study by agar-disc diffusion and minimum inhibitory concentration displayed encouraging results in both the Lichens. Moreover, GC-MS analysis deciphered a good number of compounds belonging to phenols, benzofurans, flavonoids, alkaloids, terpenoids, fluorinated compounds, fatty acids, alcohols, etc., which confirmed their antioxidant and antimicrobial potential. Hence purifying such compounds ahead will of immense use for pharmaceutical needs.

Keywords: Antimicrobial, antioxidant, GC-MS, lichen, phytoconstituents

**First Report of the Comparison between Endophytic Extract of
Butea Monosperma (Lam.) Taub. And *Butea Monosperma* Var. Lutea
for Antimicrobial and Enzymatic Assay**

Shweta Singh Chauhan* and Pramod Kumar Mahish
Department of Biotechnology,
Govt. Digvijay Autonomous P.G. College, Rajnandgaon, Chhattisgarh
*Email: osh2810@gmail.com

ABSTRACT

Endophytes have been recognized as the source of many bioactive compounds of medicinal and industrial interests. The present study compares the enzymatic activity of amylase, cellulose, and proteinase; and the antimicrobial potential of extracts of six endophytes isolated from the leaves of *Butea monosperma* (Lam.) Taub. and *Butea monosperma* var. Lutea. against *Bacillus cereus*, *Klebsiella oxytoca*, *Bacillus lichiniform*, *Clostridium acetabutylicum*, and *Bacillus subtilis*. All the endophytes were able to produce amylase, cellulase, and proteinase in plate assay the highest amount of enzyme was produced by *Alternaria alternate*(S). Endophyte *Alternaria tenuissima* shows best result against *Bacillus subtilis*. All the endophytic extract shows antibacterial activity against *Bacillus cereus* and *B. subtilis*.

Keywords: Agar diffusion, Amylase, *Butea monosperma* (Lam.) Taub., *Butea monosperma* var. Lutea., Cellulase, Endophytic fungi, Proteinase

***Hibiscus sabdariffa*: A multifaceted plant having the numerous potential activities**

Simran Jot Kaur^{1*}, Richa^{1**}

¹Department of Biotechnology,
Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab
Email: simirock@rediffmail.com

ABSTRACT

Bioactive compounds such as alkaloids, flavonoids, polyphenols glycosides, tannins, saponins and terpenoids showed strong presence in the aqueous, methanol, acetone and chloroform extract of *Hibiscus sabdariffa* flowers. Plant extracts exhibited efficient antibacterial activity against food borne pathogenic bacteria *E. coli*, *B. cereus*, *P. aeruginosa*, *S. aureus* and *Streptococcus* sp. Promising total phenolic content, total flavonoid content and total antioxidant capacity reported in these extracts can be exploited in various industries. Moreover, anti-biofilm and cytotoxic activity can be further carried out in these extracts.

Keywords: *Hibiscus sabdariffa*, Bioactive compounds, Antibacterial activity

Screening of gut microbes to combat Vit. B12 deficiency

Sonia Ambade, Yogita Patil

Department of Microbiology H. V. Desai College, Pune

Email: soniya.ambade@hvdesaicollege.edu.in

ABSTRACT

Probiotics are “live strains of strictly selected microorganisms which, when administered in adequate amounts, confer a health benefit on the host”. Probiotics exert their mode of action by altering the local environment of the gut by competing with the pathogens & imparting health benefits like synthesis of vitamins. In present study total 10 cultures were isolated from human infant feces having probiotic potential & ability to synthesize vitamin B12 which is a measure issue in vegan diet. Isolate YP8, YP9 & YP10 promising Vit. B12 producing probiotics isolated from human infant fecal sample. Alkaline black water does not significantly influence the growth performance of isolates.

Keywords: Vit. B12, gut microbes, Probiotics

SIII-PP-93

Biosynthesis of zinc oxide nanoparticles, optimization using Box Behnken design and its antibacterial, antibiofilm, antiproliferation, antituberculosis effects

Sowmiya T

Department of Environmental Science Periyar University Salem

Email: sowmiyagiri03@gmail.com

ABSTRACT

To investigate its potential use in health and the environment, the present study aimed to synthesise ZnONPs from *Pseudomonas aeruginosa* supernatant. Zinc nanoparticles were created using *Pseudomonas aeruginosa* supernatant, and they were examined using UV-Vis, FTIR, XRD, and SEM. Statistical optimization was used to raise the yield of nanoparticles. Five separate variables (pH, temperature, hours, inoculum, and concentration of nanoparticle precursors) were first optimised in the Box-Behnken experiment design (BBD). Additionally, harmful pathogens like *E. coli*, *B. subtilis*, *staphylococcus aureus*, and *Pseudomonas fluorescence* showed signs of the antibacterial and antibiofilm activities. ZnONPs have been found to have the ability to inhibit bacterial growth at all concentrations. *Pseudomonas fluorescence* exhibited the largest zone of inhibition (25 mm in size) at a concentration of 100 g/ml, and *Staphylococcus aureus* exhibited the smallest zone of inhibition (12 mm in size) at a concentration of 25 g/ml. The *Staphylococcus aureus* ZnONPs showed a 23% comparable biofilm reduction percentage for generated 100 mg/ml among the four bacterial cultures. *Pseudomonase fluorescence* - 100 mg/ml produced ZnONPs exhibit 16%. ZnONPs, for *B. subtilis* produced at 100 mg/ml demonstrate an 18% yield, ZnONPs from *E. coli* exhibit 17% for synthesised 100 mg/ml. In this study, ZnONPs were discovered to show dose-dependent anti-proliferative effects against HepG2. Additionally, the HepG2 cell line's IC50 value for ZnONPs was determined and found to be 41.62 g/ml. Inhibition for S2(ZnONP) was obtained utilising the Microplate Alamar Blue Assay (MABA) with ZnONP against *M. tuberculosis* (H37Ra).

Keywords:- *Pseudomonas aeruginosa*, bacterial synthesized nanoparticles; Box-Behnken experiment design; Antibacterial activity; Antibiofilm activity; Anti-proliferative; Anti-TB activity.

SIII-PP-94

Pharmacological evaluation of gold nanoparticles synthesized using seed and pod of *Elettaria cardamomum*- A comparative study

Sowmya K M, R T Narendhirakannan

Department of Biochemistry, Kongunadu Arts & Science College
(Autonomous), G.N. Mills P.O, Coimbatore, Tamil Nadu, India

Email: rtnaren@kongunaducollege.ac.in

ABSTRACT

The biosynthesis of metallic nanoparticles has become a promising field of research, due to their unique features and extensive application in the pharmaceutical field. The present work is a comparative study on the pharmacological activities of gold nanoparticles synthesized using aqueous extract of seed and pod of *Elettaria cardamomum*. Formation of gold nanoparticles was confirmed preliminarily by the visual observation of colour change from pale yellow to deep violet colour. Different characterization studies like UV Vis, XRD, TEM, EDAX, and FTIR analysis were carried out to further confirm the formation of gold nanoparticles and their morphology. The in-vitro pharmacological evaluation revealed that the gold nanoparticles synthesized using the *Elettaria cardamomum* pod possess significant antimicrobial, antioxidant, and anti-inflammatory potential than the gold nanoparticles synthesized from *Elettaria cardamomum* seed.

Keywords: *Elettaria Cardamomum*, Gold nanoparticles, Pharmaceutical, Antioxidant, Anti-inflammatory, Antimicrobial

SIII-PP-95

Glucose-lowering and hypolipidimic activities of ethanolic extract from *Aloe vera* in STZ-induced diabetic rats

Srikrishna, P¹, Sudha, Prem,A. Rojarani*

¹,*Department of Genetics , Osmania University, Hyderabad.

Email: srikrishna.pabbathi30@gmail.com

ABSTRACT

Aloe vera is a traditionally, and a medicinal plant has been employed to treat skin problems (burns, wounds, and anti-inflammatory processes). Moreover, Aloe vera has shown other therapeutic properties including anticancer, antioxidant, ant diabetic, and anti hyper lipidemic. which has tremendous biological activities In this study aimed to asses the glucose-lowering and hyper lipidimic effects of ethanolic extract from Aloe vera. (AV) in Streptozotocin (STZ) – Induced mice. Aloe vera leaves were extracted in hot water and ethanol was mixed. I used most convenient method Shodex sugar KS 804 Column chromatography. The supernatant was collected and mixed with absolute ethanol at a ratio of 1:3 for 12 h. The crude extracts are obtained by ethanol precipitation method. To asses the hyperlipidimic activity in induced diabetic mice used crude extract given to mice through oral in some cases with STZ .and other drugs through subcutaneous way. For 30 days with different concentration of drugs in form of slaine or liquid by using micro syringe. After completion of treatment with aloevera extract diabetic induced mice showed normal glucose level.

Keywords: Hypolipidimic activity, therapeutic, *Aloe vera*

Bio-applications of mycosynthesized copper oxide nanoparticles

Sruthi Radhakrishnan, S. Kavibharath, Vellingiri Manon Mani*, R. S. Saranya, M. P. Ayyappa Das, A. Parimala Gnana Soundari

Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Coimbatore, Tamil Nadu, India.

*Email: manonmanisathee12@gmail.com; radhakrishnan.sruthi4@gmail.com

ABSTRACT

Copper Oxide Nanoparticles (CuONPs) contain medicinal properties and are an essential component of the next generation due to their unique properties. CuONPs have a vital role in therapeutics, especially for cancer treatment. This study's main focus was synthesizing the CuONPs and assessing the anti-cancer activity, including the *in vitro* anti-angiogenesis and cytotoxicity analyses. CuONPs are synthesized using the enzymatic suspension of endophytic fungal strains FCSRL3 and FCPRS11 isolated from the *Azadirachta indica* (Neem tree) grown in a minimal medium at optimum pH 7.2. About 14 different endophytic fungi confined from the neem tree, and the antagonistic and antioxidant properties were evaluated. The efficient FCSRL3 and FCPRS11 were identified as *Aspergillus sydowi* & *Aspergillus versicolor* at a molecular level. The synthesized CuONPs from two fungi were confirmed through characterization determination using SEM, EDAX, FT-IR, and XRD analyses. CuONPs revealed maximum antibacterial, antimycotic, and antioxidant activities at minimum concentration, exerting the highest bioactive properties. The anti-angiogenic activity of the CuONPs from two different fungal strains exhibited maximum inhibition of blood vessels in chick embryos, and the assessment was performed using HET-CAM. The outcomes of this research demonstrate the notable part of CuONPs in cancer remedies.

Keywords: Copper oxide NPs; Endophytic fungi; Anti-cancer properties; Anti-angiogenic properties.

Synthesis of cellulase based silver nanoparticles and its dye degradation properties

Subalekha Rajendran, Venkatesan Srinivasan*

Microbial Ecology Laboratory,
Department of Environmental Science,
School of Life Science
Email; subalekha3@gmail.com

ABSTRACT

Cellulases are a complex group of enzymes which are secreted by a broad range of microorganisms including fungal, bacteria, and actinomycetes. This study is conducted to produce cellulase from fish gut bacteria have been carried out. The Extra cellular enzyme from fish gut bacteria used to carried out microbial activities are Amylolytic, proteolytic and cellulolytic microflora were identified from the culture plate using selective media. The isolated bacterial strain were optimized for enzyme production by using various parameters like temperature, pH and media (carbon sources, nitrogen sources, mineral sources) in mineral salt medium. The isolated potential bacterial strain was used for mass production of enzyme to optimized fermentation medium. After the synthesized media was taken for centrifugation process the supernatant was collected and added with AgNPs. The characterization of Extracellular enzyme with AgNPs used for dye degradation. Comparatively the cellulase based silver nanoparticles shown good results in dye degradation in different concentrations with different time intervals. The final study a combination of cellulase enzyme with silver nanoparticle not only degrade the azo dyes it also enhances antibacterial and anti-biofilm activities of selected human pathogens.

Keyword: Cellulase, Enzyme activity, Optimization of Enzyme Production, Cellulase based AgNPs, Optimization of AgNPs, Dye Degradation Properties, Anti-bacterial, Anti-biofilm Activity.

A Rapid and efficient fungal genomic DNA extraction protocol

Suchita V. More^{1,*}, Gulab M. Rathod², Arun S. Kharat³, Jeetendra A. Kulkarni⁴

¹Department of Biotechnology, Dr. BAMU sub-campus Osmanabad.

²Department of Botany, Shrikrishna Mahavidhyalay, Gunjoti.
Osmanabad

³Laboratory of Applied of Microbiology, School of Life Sciences

⁴Department of Biotechnology, Dr. Babasaheb Ambedkar Marathwada
University, Sub-campus Osmanabad

*Email:suchu.more@gmail.com

ABSTRACT

Fruit-based pathogens are leading reasons for harvest loss in developing countries. Identification process of such isolates can be paced by genetic fingerprinting. This needs PCR standard genomic DNA and rapid gDNA isolation procedure. 2% Cetyltrimethyl ammonium bromide (CTAB) extraction buffer and Phenol-Chloroform-isoamyl alcohol (PCI) was used for the isolation of fruit pathogenic fungal genomic DNA. The goal of this study was to assess the quality of total DNA from selected pathogenic fungi like *Aspergillus flavus*, *Alternaria alternata* and *Fusarium oxysporum*. Modified Extraction buffer and early PVP application in crushing of tissue was done.

Keywords: Carica papaya, genomic DNA, extraction.

SIII-PP-99

Detection of biofilm among uropathogenic *E. coli* and their susceptibility pattern and detection of minimum inhibitory concentration of fosfomycin.

Sudeep Kumar M¹, **Bhavya HP**², Sumaira Qayoom
Department of Microbiology, SSMC, Tumkur, Karnataka
Email: sudeepkumar65@yahoo.co.in

ABSTRACT

Urinary tract infections occur when microorganisms invade the urinary tract. Entry of microorganisms to the urinary tract occurs via the urethra and they multiply in the bladder. Hence this study aims to detect antibiotic susceptibility pattern of biofilm producing uropathogenic *E. coli*, detection of minimum inhibitory concentration of fosfomycin against biofilm forming uropathogenic *E. coli*. Out of 150 isolates, a total of 31 isolates formed biofilm. Antibiotic susceptibility testing was performed for 31 biofilm forming uropathogenic *E. coli* followed by detection of MIC for fosfomycin. In present study, 96.7% of the isolates were resistant to amoxyclav, 93.5% were found to be resistant to ampicillin followed by 87% to Cefipime, 74.1% to Ceftazidime, 58.0% Imipenem, 54.8% Cefotaxime. 93.5% of the isolates were sensitive to Colistin followed by 83.8% to Cotrimoxazole, 80.6% to Amikacin, 77.4% to Nitrofurantoin, 67.7% to ciprofloxacin, 64.5% to Ceftriaxone, 67.7% to Gentamicin. In present study, 7 (25.8%) isolates had MIC value of 0.50 µg/ml followed by 13 (45.1%) isolates with MIC of 0.75 µg/ml, 8 (22.5%) isolates with MIC of 1 µg/ml, 3 (6.4%) isolates with MIC of 1.5 µg/ml of fosfomycin. A higher concentration of antibiotic fosfomycin was required to inactivate organisms growing in a biofilm, thus it is better to treat the patients with antibiotics based on biofilm susceptibility rather than planktonic susceptibility.

Keywords: Biofilm, Minimum inhibitory concentration (MIC), Fosfomycin, Uropathogenic *E. coli* (UPEC)

SIII-PP-100

Antimicrobial activity of *Ocimum sanctum* against bacterial pathogens

Sudeep Kumar M¹, Veena K², Neha³

Department of Microbiology, SSMC, Tumkur, Karnataka

E-mail: sudeep@gmail.com

ABSTRACT

Ocimum sanctum has medicinal values and can be used to combat emergence of drug resistance among bacterial pathogens and to assess the antimicrobial activity of *Ocimum sanctum* against bacterial pathogens. Extract of Leaves, flower and seeds was prepared by Alede and Irobi method. Different concentrations 250µg, 500µg and 1000µg of *Ocimum sanctum* was tested against bacterial pathogens by disk diffusion method. Gram negative bacteria had a zone of inhibition of 17mm. The antimicrobial activity in cold water extract was better. Leaf extract was good against bacterial pathogens.

Keywords: Antimicrobial activity, Extract, *Ocimum sanctum*

SIII-PP-101

**Comparison of effect of Malathion and Lindane on Ascorbic Acid in
Eisenia fetida (Savigny)**

Sudipta Chakrabarti, Kajari Das, Puspanjali Parida
Department of Zoology & Biochemistry, Baripada Odissa
Email: sudipta.m777@gmail.com

ABSTRACT

Pesticides are integral part of modern agriculture and are increasingly used in tropical countries. These cause toxicity and bio accumulation. Antioxidant enzymes in earthworm *Eisenia fetida*, were chosen for their susceptible compensatory responses to environmental contaminants and can be applied to study toxicity effects on vertebrates, invertebrates and plants. Ascorbic acid (ASA) is a vital, ubiquitous antioxidant which scavenges reactive oxygen species in biological fluid. In our study, 24 hour treatment of Malathion resulted in declined level of ASA, which was found to be heightened in landane treatment.

Key words: *Eisenia fetida*, Malathion, Lindane, Ascorbic acid

SIII-PP-102

Biomolecular transducer for translation in cell

Sumanta Kumar Roymohapatra

Anchalika Mahavidyalaya,
Pragyan Vihar, Siminai,
Dhenkanal, Odisha.

Email: skroymohapatra@hotmail.com

ABSTRACT

Biomolecules such as enzymes, nucleic acids and structural transformation act as sensor and perform as molecular receptor. The specific proteins of the microorganism sense specific molecule is usually converted into signals for cellular modifications and synthesis of specific protein. These elements possess much higher performance in terms of sensitivity, selectivity and stability. The experimental analysis that determines the sensing elements hit the target analyte. The experimental living microorganism *Anabaena cylindrica* also works in the form of biofilm to carry out the function for bioaccumulation of different phosphates in the culture medium and coupling of urea act as transducer for translation in the cell.

Keywords: Biomolecules, Bioreceptor, *Anabaena cylindrica*, Enzymes, Phosphates, Coupling, Sensitivity, analyte, Transducer, Translation, Sensor

SIII-PP-103

Exploitation of chicken feather waste as a plant growth promoting agent using keratinase producing novel isolates *Bacillus wiedmanni* SAB10

Sumita Sahoo^{1,2}, Arpita Mandal², Biswajit Rath*

¹ Department of Biotechnology, Maharaja Sriram Chandra Bhanja Deo University, Sriram Chandra Vihar, Takatpur, Baripada, Odisha

² Departments of Microbiology, Asutosh College, Bhowanipore, Kolkata, West Bengal

Email: sumitasahoo2105@gmail.com

ABSTRACT

The Indian agricultural is mainly based on chemical fertilizer to get better yield. Bioprocessing of chicken feather prepared from an efficient newly isolated bacterial strain, *Bacillus wiedmanni* SAB10 is used to produce nitrogen rich liquid fertilizer. The cell-free hydrolysate was prepared from submerged fermentation of poultry litter as sole media supplement to chicken feather for 72h at pH 10.6. Fermented hydrolysate contains amino acids, Oligopeptides and Thiol which influence growth and yield of Mung bean, Tomato and Chili plants in pot trials. This fertilizer not only makes plant healthy but also drought which infers for its use as eco-friendly, cost-effective smart liquid fertilizer in near future.

Keyword: Amino acid, Bioprocessing, ecofriendly, feather hydrolysate, oligopeptides

SIII-PP-104

Molecular Docking Analysis of Sesquiterpenes as HIV-1 Entry Inhibitors Targeting Gp41 Pocket

Swapna Gurrapu

Parkal Degree College,
Hanumakonda, Telangana
Email: swapnagurrapu@kakatiya.ac.in,

ABSTRACT

Gp41 and its conserved hydrophobic groove on the NHR region is one of the attractive targets in the design of HIV-1 entry inhibitory agents. This hydrophobic pocket is very critical for the progression of HIV and host cell fusion. Our molecular docking have identified one such herbal molecule sesquiterpenes that may bind HIV-1 Entry Inhibitors Targeting gp41 with high affinity to cause non-competitive inhibition. Results are also compared with other US FDA approved drugs. Docking study suggest that the ligand cyclozaronone has high binding energy (-9.48) compare to other sesquiterpenes ligands -9.43, -9.26, -8.54, -9.28, -7.46, -7.29, -8.13, -8.61, -7.28, -7.29 respectively and ligand sesquiterpenes has strong binding interactions with GLN, ASN amino acids, all of which belong to one or the other catalytic pockets of HIV-1gp 41. It is expected that these binding energy and binding interaction could be critical in the inhibitory activity of the HIV-1 gp41. Therefore, this study provides an evidence for consideration of cyclozaronone as a valuable natural molecule in the treatment and prevention of HIV- 1 Entry Inhibitors targeting gp41.

Keywords: Sesquiterpenes, Cyclozaronone, Gp41, HIV-1

SIII-PP-105

Metal ions fingerprinting of Ashwagandhadi Lehyam using ICP-MS

Swathika Suresh, Krishnapriya Santhanu, Kanimozhi Natarajan,
Kalaiselvi Senthil*

Department of Biochemistry, Biotechnology and Bioinformatics.
Avinashilingam Institute for Home Science and Higher Education for
Women, Coimbatore

E-Mail:kalaiselvi_bc@avinuty.ac.in, swathikaswathika20@gmail.com

ABSTRACT

Withania somnifera commonly known as Ashwagandha is predominant medicinal herb considered as a Rasayana in Ayurveda. Ashwagandhadi Lehya is one of the polyherbal formulations referred in Ancient Ayurvedic text like Charka samhitha and Ashwagandha is one of the dominant ingredient in this formulation. The medicament used for Rakta vikar (blood disease), Kratva (Cachexia), Ara (Piles), Unamada (Psychosis) and Balya Rasayana (Rejuvenating agent) and an excellent aphrodisiac. Heavy metals may be hazardous to humans and present a serious hurdle in the Ayurvedic industry. The present study was conducted to analyze the difference in heavy metal profile of Ashwagandhadi Lehyam prepared in two distinct time using ICP-MS (Inductively Coupled Plasma Mass Spectrometry). We analyzed 26 metals from the fresh and stored Ashwagandhadi Lehyam. Our results emphasized that all metals are within WHO permissible limit except Lead (Pb).

Keywords: *Withania somnifera*, Ashwagandhadi Lehyam, Heavy metals, ICP-MS

SIII-PP-106

***In vitro* optimization of cellulase enzyme of isolated fungi from domestic waste soil**

Taniya Sahu, Bhavika Sherma
Department of Microbiology, Govt.V.Y.T.P.G(Autonomous),Durg
Email: taniyasahu63@gmail.com

ABSTRACT

Cellulose are consisting of a complex hydrolytic enzyme capable of hydrolyzing this material to smaller sign components like glucose units. This enzyme system which shows excellent derivative action towards crude natural cellulosic material is routinely found in most fungi and essentially comprises three main components; exopolysaccharide, endopolysaccharide and beta-glucosidase. A large number of fungi have been isolated by various investigations from self-heating material and other sources that play an important role in decomposing municipal solid waste at an elevated temperature. Fungi are capable of producing extracellular enzymes responsible for the degradation of cellulose are known, some of them being highly cellulolytic and capable of digesting cellulose. Fungi such as *Aspergillus Niger*, *Trichoderma*, *Aspergillus fumigatus* and *Mucor* species are cellulose producers. The enzyme produced by these microorganisms is commercially available for agricultural and industrial products and has been the hallmark of all commercial fermentation processes.

Keywords: Cellulase, decompose, domestic waste

SIII-PP-107

**Isolation and Characterization of Potassium Solubilizing Bacteria
from Soil Samples of Different Areas of Raipur, Chhattisgarh, India**

¹Twinkal Shriwas*, ²Swati Rose Toppo

¹Department of Microbiology, St. Thomas College, Bilai, Chhattisgarh

²Atal Bihari Vajpayee University, Bilaspur, Chhattisgarh

*Email: twinkalshriwas21@gmail.com

ABSTRACT

Potassium solubilizing bacteria were isolated with the aim to screen the best potassium solubilizer. A total of three KSB has isolated from soil samples of the chandanidih area of Raipur district Chhattisgarh. All three isolates among twenty were morphologically and biochemically characterized and all were found to be positive for the citrate utilization test, C1 positive for gelatin hydrolysis test and G2 positive for MR test and all were negative for the catalase test. Among three isolates (G2) showed the highest zone of solubilization efficiency of 3.9 centimeters in three days of observation. And identified as *Methylophilus* species by molecular identification and phylogenetic analysis.

Keywords: Solubilization, Microorganisms, Potassium, soil.

SIII-PP-108

Protoplast isolation of *Catharanthus roseus* using extracted fungal enzyme

Ujjwala Supe

Plant Tissue Culture Laboratory,
Department of Biotechnology,
St. Thomas College, Ruabandha, Durg
Email: ujsupe@gmail.com

ABSTRACT

The present work was carried out for the isolation and extraction of cellulase and pectinase enzymes from isolated fungi. The enzymes producing fungi were isolated from the different substrate. From the result, it was shown that enzymes producing fungi can grow in optimized conditions.

Most work on enzymes production has been oriented in a direction of using cellulose and pectin obtained from wheat bran and orange peel. Our finding provides an alternative cheaper source of substrate for enzyme production thus, wheat bran and orange peel could be an alternative and promising substrate in submerged fermentation for the production of cellulase and pectinase by fungal species. The fungi grew with the highest yield of extracted cellulase and pectinase enzymes during the purification process. Protoplasts were isolated from leaves of *Catharanthus roseus* by using extracted enzyme. The leaves were sterilized and incubated in different enzymes and the combination of extracted cellulase and pectinase. Results revealed that the highest number of protoplasts, 8×10^5 cells per gram of fresh weight was from 0.4% extracted cellulase and pectinase. In present investigation also studied that pH and Temperature also affect protoplasts isolation. Isolated protoplasts were cultured well in NT medium having 2-4-D (2mg/l) and successfully in which white-coloured solid colonies were obtained. Therefore, it can be employed in industries for hydrolysis cellulose and pectin to utilize bioproduct.

Keywords: Enzyme, cellulase, Pectinase, Fungus, Protoplast, *Catharanthus roseus*

SIII-PP-109

MD simulation study of A/T absent 'sticky end four way DNA junction' at various physical and chemical environment

Umesh Yadava, **Akanksha Singh**

Department of Physics, DDU Gorakhpur University, Gorakhpur, UP,
India

Email: asjnv1992@gmail.com

ABSTRACT

Designing treatments may be aimed towards deciphering the dynamics and structure of different higher-order DNA structures, such as those in branched form. Employing large interval molecular dynamics simulations and a variety of synthetic physiological circumstances, we present here the inherently dynamic and folded transformations of a unique DNA junction with the sequence d(CGGCGGCCGC)₄ that self-assembles into a 4-way junction structure of DNA with sticky ends. This work has led to the conclusion that DNA junction periodic configurations can readily be produced and modified for a variety of functions, including genetic biomarker, DNA biosensors, DNA nano-technology, DNA Zippers, etc.

Keywords: DNA junction; Molecular simulation; Conformation; pH dependence of DNA junction

SIII-PP-110

Endophytes with lovastatin producing potential

Vaishali A. Fulzele and Ashwajit A. Fulzele*

*S. M. Mohota College of Science, Nagpur

Email: vaishwani@gmail.com

ABSTRACT

Endophytes reside in plants and are rich reservoirs of secondary metabolites. Lovastatin is one such secondary metabolite with hypocholesterolemic action. In this study endophytes were isolated from different parts of *Azadirachta indica* as leaves, stem and bark and studied for their lovastatin producing potential. Lovastatin was extracted and quantified by spectroscopic and chromatographic methods from these endophytes. Total thirteen endophytes from stem screened for lovastatin production confirmed by HPLC. *Pleurostoma ootheca* (NS1a111) from stem showed highest lovastatin production while other endophytes produced lovastatin in considerable amount. *Azadirachta indica* harbor varieties of fungal endophytes that shows pharmaceutically important drug lovastatin producing potential.

Keywords: Endophytes, *Azadirachta indica*, lovastatin, hypocholesterolemic agent.

SIII-PP-111

Green synthesis, characterization and evaluation of antibacterial and dye degradation potential of copper oxide nanoparticles

Vaishnavi S and Saranya R. S.*

Department of Biotechnology,
Rathnavel Subramaniam College of Arts and Science,
Coimbatore, Tamil Nadu, India.

* Email: manonmanisathee12@gmail.com

ABSTRACT

Nanotechnology that deals with dimensions and tolerances of less than 100 nanometers, especially the manipulation of individual atom. The present study was aimed to green of copper oxide nanoparticles *Murraya koenigii* has more medicinal properties and it shows great application in the field of nanotechnology to green synthesis the nanoparticles. Copper oxide nanoparticles have attracted much attention due its application in industries and medicine. The green synthesis of copper oxide nanoparticles using aqueous solution of *Murraya koenigii* with copper sulphate solution by simple precipitation technique. The morphology of copper oxide nanoparticles was subjected to FE-SEM with EDX. The studies revealed the cubic shape of particles with average size of nanoparticles and the qualitative and quantitative of the concentration of specific elemental composition of copper oxide nanoparticles are measured by the peaks was identified by graphical representation by using EDX. Further the study investigates the antimicrobial activity of two different organisms that are *Pseudomonas aeruginosa* (gram negative bacteria) and *Bacillus subtilis* (gram positive bacteria) carried out against green synthesized copper oxide nanoparticles using agar well diffusion method. Photocatalytic degradation of dye is one of the most effective method. The degradation of methylene blue dye with different concentration of copper oxide nanoparticles was observed under sunlight after 24 hours.

Keywords: Green synthesis, copper oxide nanoparticles, photocatalysis

Antioxidant extraction by fruits and its assay

Vandhana Priya R, V. Manon Mani and Sruthi Radhakrishnan*

Department of Biotechnology,
Rathnavel Subramaniam College of Arts and Science,
Coimbatore, Tamil Nadu, India.

* Email: manonmanisathee12@gmail.com

ABSTRACT

Fruits and vegetables are very good sources of antioxidants those consist of many different antioxidant components. Red fruits, as rich antioxidant foods, have gained over recent year's capital importance for consumers and manufacturers. All methods for assessing the total antioxidant capacity (TAC) of food samples are strongly affected by the solvents used during extraction. Fruit residues with high protein contents are generated during the processing of some fruits. Alternatively, more sustainable strategies based on the use of high-intensity focused ultrasounds, microwaves, pressurized liquids, electric fields, or discharges, as well as deep eutectic solvents, are being implemented for the extraction of proteins. The antioxidant activities evaluated by both ORAC and DPPH showed similar trends where red guava and carambola exhibited the highest and sapodilla and green papaya exhibited the lowest levels. Guava and mamey sapote exhibited the highest TDF and pectin levels.

Keywords: Antioxidants, fruits, vegetables.

SIII-PP-113

**Evaluation of exoantigens in the serological diagnosis of
phaeohyphomycosis**

Varsha Aglawe

Department of Zoology and Biotechnology,
Government Science College, Jabalpur.India.
Email: dr.vaglawe@yahoo.com

ABSTRACT

Serodiagnosis of fungal infections is of great significance because of its rapidity in disease diagnosis and identification of the pathogens. Serological technique based on exoantigens of pathogen is currently being used for the same. In the present study role of exoantigens of some dark pathogens have been evaluated in the diagnosis of phaeohyphomycosis. Culture filtrate antigens of *Curvularia verruculosa*, *Alternaria alternata* and *Cladosporium cladosporioides* were prepared and analyzed. Antisera to these pathogens were raised in rabbits immunized with the respective culture filtrate exoantigens. Immuno diffusion test was performed to determine the precipitin lines and cross – reactivity of these exoantigens. The exoantigens and antisera were further subjected to SDS-PAGE analysis. In case of *A.alternata* and *C.cladosporioides* humoral response was evident after one week of immunization, whereas in case of *C. verruculosa* it could be detected from second week onwards. All the exoantigens gave two bands each of molecular weight 15 kda and 67 kda. The antisera analysis revealed increase in several serum protein factors after immunization. The results indicated that the entire test strains produced bands of identity against their homologous antisera. No cross- reactions were observed with the heterologous antiserum. Our data suggests that the exoantigen procedures could be used as a reliable tool for the accurate immunoidentification of systemic phaeohyphomycosis.

Keywords: Serodiagnosis, Phaeohyphomycosis, Exoantigen, Immunization.

SIII-PP-114

Endophytic fungi as Bio Control Agents (BCA) isolated from *Aegle marmelos* against phytopathogens of *Solanum lycopersicum* L (Tomato)

Vellingiri Manon Mani^{1†*}, Manikandan Vasuki^{1†}, Arockiam Jeyasundar Parimala Gnana Soundari^{1&2}, Sruthi Radhakrishnan¹, R. S. Saranya¹, M. P. Ayyappa Das¹

¹ Department of Biotechnology, Rathnavel Subramaniam College of Arts & Science, Coimbatore, Tamil Nadu, India.

² Department of Environmental Science & Engineering, College of Natural Resources & Environment, Northwest A& F University, Shaanxi, China.

† Authors contributed equally

* Email: manonmanisathee12@gmail.com

ABSTRACT

The world is facing a prodigious problem on chemical pesticides applied on agricultural farms which eventually subsides the soil fertility due to non- degradation of the compounds. In order to limit this issue the modern biological technologies initiated the research on bio control agents to maintain the soil fertility. *Solanum lycopersicum* L (Tomato) is the second most cultivable vegetable throughout the world and it is easily infected by several pathogenic bacteria, fungi, virus and nematodes. There are various chemical pesticides which prevents the pathogenicity caused by microbes or pests. But this may be easily prevented, cured or inhibited by lowering the pathogenicity caused by the disease causing pathogens with the help of bio control agents. In this investigation, we aimed to develop the bio- control agents as endophytic fungi isolated from Marudhamalai and Vellingiri hills, Coimbatore of Western Ghats region, Tamilnadu, India against most common phytopathogens of tomato such as *Fusarium solani*, *Fusarium oxysporum* f. sp. *lycopersici* and *Alternaria solani*. The isolated endophytic fungal strains were assessed for the bio- potentiality through antagonistic activity and characterized. The endophytic fungi such as *Alternaria citrimacularis* FC8ABr, *Aspergillus terreus* FCBY1, and *Cladosporium tenuissimum* FCBGr exhibited highest antagonistic activity and bio control activity performed by dual culture technique. Further the strains were determined for the *in vivo* growth inhibition of pathogenicity caused by phytopathogens in the plant by three different inoculation techniques

such as application on lower stem, soil drenching and root dipping methods. The plants were inoculated and assessed for the disease severity by score method. Further, the tested plants were determined for the phytochemical and biochemical constituents for the treated and control plants.

Keywords: *Alternaria* sp, *Aspergillus* sp, Bio control agents (BCA), biochemical, endophytes, fungi, Fusarium wilt, phytopathogens, phytochemicals.

SIII-PP-115

Nanoremediation of ground water contaminants using CuONPs and ZnONPs synthesized from endophytic fungi

Vellingiri Manon Mani¹, Munaf Mohammed Basha^{1&2}, M. P. Ayyappa Das¹, P. Kokila, B¹. Divya¹

¹ Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Coimbatore-, Tamil Nadu, India.

² Department of Biotechnology, National College, Trichy, Tamil Nadu, India.

Email: manonmanisathee12@gmail.com

ABSTRACT

The global wide threatening problem is the pollution especially water and soil pollution are biggest threats to our people. The pollution not only damages the resources but also enters the ecosystem and impairs our health. The pollution disfigures the fertility of the soil and contaminates the ground water table which is the most reliable source of all living organisms. Due to urbanization of people and scarcity of the water resources the people relies on the ground water for the domestic and drinking needs. The advancement in science and technology paved a path as nanotechnology to overcome these problems. In this current investigation the Copper Oxide Nanoparticles (CuONPs) and Zinc Oxide Nanoparticles (ZnONPs) were synthesized from endophytic fungal strains that was isolated from *Aegle marmelos*. The CuONPs and ZnONPs were characterized through SEM, XRD, EDX, UV- Vis spectrum and FT- IR analyses which were previously reported. The ground water samples were collected near, in and around of the garbage- dump site of Vellalore – Kurichi village, Coimbatore, Tamilnadu, India; three areas were selected and water samples were collected. The basic physico- chemical parameters such like BOD, COD, TDS, hardness, pH, chlorides, sulphates, nitrates and heavy metal(s) of the collected samples were analysed. The adsorption studies were initiated with three different concentrations of CuONPs and ZnONPs in 100 mL of polluted ground water samples, and the kinetics was started with 0th hour and extended till 180 minutes. The adsorption rate increased with the increase in time; the CuONPs and ZnONPs adsorbed the pollutants including Arsenic (V) effectively. The nanoremediated samples were further taken to determine the effectiveness in aiding the plant growth promotion and this was executed in *Trigonella* sp plants. The plants were grown well which was compared to the control plants and the phytochemical assessment was

carried out. The presence of phytochemicals of the plants grown in nanoremediated samples was similar to that of control plants. Further, the CuONPs and ZnONPs has the ability in remediating the pollutants/contaminants in the ground water.

Keywords: Endophytic fungi, Copper oxide nanoparticles, nanoremediation, phytochemicals, zinc oxide nanoparticles.

SIII-PP-116

**Effect of chrysin on ammonium chloride induced hyperammonemia
in rats**

Vijayakumar N.

Department of Biochemistry and Biotechnology,
Faculty of Science,
Annamalai University,
Annamalainagar, Tamil Nadu, India.
Email: nvkbiochem@yahoo.co.in

ABSTRACT

This study was designed to elucidate effects of chrysin on ammonium chloride (NH₄Cl) Induced hyperammonemia rats. For induction of experimental hyperammonemia, NH₄Cl was injected i.p at a dose of 100 mg/kg b.w., meanwhile chrysin were administered orally at a dose of 100 mg/kg b.w. for thrice a week for eight consecutive weeks. The biochemical parameters and histological alterations in liver sections were observed. Expressions of apoptotic markers were examined by means of immunohistochemical-staining analysis. Our results revealed that chrysin administration significantly attenuated the biochemical parameters and histological alterations of liver. Chrysin could offer hepatoprotection produced by NH₄Cl induced hyperammonemia.

Keywords: Hyperammonemia, Liver damage, Apoptosis, Liver marker enzymes, Chrysin.

SIII-PP-117

Study of Molecular Structure and assignments of 3- (6-phenoxypyridin-3-yl)-1H-pyrazolo[3,4-d]pyridin-4- amine

Vijay Kushwaha, Umesh Yadava

Deen Dayal Upadhyay Gorakhpur University Gorakhpur

Email: u_yadava@yahoo.com

ABSTRACT

Molecular structure surveys the Electronic structure and geometric confirmations of the molecule from only knowledge of its constituents atoms. In the present work, quantum mechanical calculations of the molecule namely 3-(6-phenoxypyridin-3-yl)-1H-pyrazolo [3,4- d] pyridin-4-amine have been performed by Density Function Theory using the standard 6-31G**basis set. The electronic structure, dipole moment, frontier orbital energy, thermal parameters (entropy, enthalpy, internal energy), Infrared (IR) spectral lines of the molecule are elaborated. To study the chemical reactivity of; molecular electrostatic potential (MEP) surface and some other parameters of the molecule were also investigated. On the basis of these calculations, it has been established that the molecule is chemically reactive and may be used in designing drugs.

Keywords: DFT, HOMO -LUMO, Chemical reactivity; IR assignments; GAUSSIAN09; Density Function Theory AGUI8.16.

SIII-PP-118

Mutational analysis of azoreductase enzyme from *Pseudomonas aeruginosa* towards enhancement of binding affinity: A computational approach

Vinita and Raju Poddar*

Department of Bioengineering & Biotechnology,
Birla Institute of Technology-Mesra, Ranchi, JH
Email: rpoddar@bitmesra.ac.in; vinita09870@gmail.com

ABSTRACT

Azoreductases are industrially important enzymes solely due to their azo dye degrading ability. With the sole purpose of increasing azoreductase (paAzoR1; *Pseudomonas aeruginosa* PA01) activity so as to attain enhanced dye degradation, six mutants were generated computationally. The approach was to increase number of substrate-enzyme interactions, so as to increase binding affinity towards corresponding dye substrate. Enzyme's active site was evaluated through available literature and various computational approaches like results from molecular dynamics simulation (100 ns) of wild type (2V9C) and docking of wild type (non-mutant) with substrate methyl red (an azo dye). On the basis of which, amino acid residues present in the binding pocket were selected and exploited for mutation. Generated mutants were put to simulations for optimization with energy minimization and investigation for stability. The optimized mutants were then docked with methyl red to verify enzyme-substrate binding. All the mutants developed were found to have good stability.

Keywords: Azoreductase, mutation, docking, molecular dynamic simulation, paAzoR1, azodye.

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