PRODEEDINGS

OF THE

107TH INDIAN SCIENCE CONGRESS

BANGALORE, 2020

PART II

SECTION OF NEW BIOLOGY

(INCLUDING BIOCHEMISTRY,BIOPHYSICS & MOLECULAR BIOLOGY AND BIOTECHNOLOGY)

President: Dr. Sudip Kumar Ghosh

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107TH INDIAN SCIENCE CONGRESS

January 3-7, 2020

Bangalore

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PRESIDENTIAL ADDRESS

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PRESIDENTIAL ADDRESS

NEW INSIGHT INTO *ENTAMOEBA* ENCYSTATION

Sudip K. Ghosh
Department of Biotechnology, Indian Institute of Technology Kharagpur, Kharagpur-721302 India
Email: sudip@bt.iitkgp.ac.in

Entamoeba histolytica, the causative agent of amoebiasis, infects human through chitin walled cyst. This wall formation during encystation is an excellent target for the development of new drugs aimed at preventing the spread of *Entamoeba histolytica*. Since *E. histolytica* cannot be encysted *in vitro*, its reptilian counterpart, *E. invadens* is used to study encystation as their cysts have similar characteristics. Two of the most important characteristic of cysts are the chitin wall and the presence of four nuclei. Here we studied the development of these two characteristics develope as the encystation proceeds. In vitro, encystation is asynchronous and completes within a time period of 72 hours. The cyst wall of *Entamoeba* consists of carbohydrate moieties like Chitin, Chitosan, and carbohydrate-binding lectins like Jacob, Jessie, and Chitinase. During the early phase of encystation, Chitin is synthesized and gets deposited on the surface of encysting *Entamoeba*. The Jacob lectin gets cross-linked with the Chitin fibrils, and finally, the deposition of Jessie makes the wall impermeable to even small molecules. By 12^{th} hour immature cysts at different stages of wall formation were observed. The wall formation appears to be starting from a single point and then spreads all over the surface of the cell. The chitin wall formation is complete by the 24^{th} hour. But at this stage, the cysts still contain only a single nucleus. The nucleus starts dividing after the 24^{th} hour. 48^{th}-hour encystation culture cysts are mostly with one or four nuclei, and a few are with two or three nucleus. At 72 hour, almost all cells contain four nuclei. During this study, 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.

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II

ABSTRACTS OF PLATINUM JUBILEE LECTURE/ AWARD LECTURES

Platinum Jubilee Lecture

HUMAN MALARIA PARASITE *PLASMODIUM FALCIPARUM:* UNIQUE BIOLOGY AND POSSIBLE INTERVENTIONS

Suman Kumar Dhar

Special Centre for Molecular Medicine, Jawaharlal Nehru University, New Mehrauli Road, New Delhi 110067

E mail: skdhar@mail.jnu.ac.in, skdhar2002@yahoo.co.in

Plasmodium falciparum causes more than one million deaths worldwide each year due to severe cases of malaria. Dependence on two different hosts, namely mosquito and human during its life cycle and residing inside the red blood cells during erythrocytic stage to evade immune system reflect some of its unique biology important for its pathogenicity. One of the crucial steps for its survival in extreme conditions depends upon its ability to replicate tremendously in both the hosts where multiple rounds of DNA replication take place without cytokinesis. However, this process is poorly understood in the parasites. The high AT-richness (~80%) of *Plasmodium* genome, the absence of all the subunits of replication initiator protein origin recognition complex (ORC), the presence of two proliferating nuclear antigens (PCNA) (unlike one in most higher eukaryotes) and unconventional trafficking of some of these proteins may shed some light in deciphering the unique biology of the parasite including DNA replication. These unique pathways may help us in finding new targets for therapy in the midst of high prevalence of drug resistance.

Prof. S.S.Katiyar Endowment Lecture

SUPPORTING RISK IN SCIENCE: EMERGENCE OF NANOTOXICOLOGY IN INDIA

Alok Dhawan
CSIR-Indian Institute of Toxicology Research
Vishvigyan Bhawan, 31,M.G. Marg, Lucknow - 226001, U.P., India
Email: alokdhawan.itrh@nic.in

Nanotechnology is exponentially expanding in application and is highly interdisciplinary in nature. The unique size-dependent properties of nanomaterials make them superior and almost indispensable in many areas. Today, more than 1800 nano-enabled consumer products are available across engineering, medicine, agriculture, food industries, and biotechnology sectors. However, nanoparticles are being incorporated into commercial products at a faster rate than the development of knowledge and regulations to mitigate potential health and environmental impacts associated with their manufacture, application, and disposal. The concern over the probable adverse effects of nanomaterials on living systems has given rise to 'nanotoxicology'. However, nanotoxicology has lagged behind nanotechnology due to a number of experimental challenges and issues faced in designing studies involving toxicological assessment of nanomaterials. The talk will address pursuing curiosity-driven science, risk-taking ability & ideating to find solutions for the various challenges in the toxicity assessment of nanoparticles.

Prof. Umakant Sinha Memorial Award

NEW AZASPIRANE SUPPRESSES THE GROWTH OF HEPATOCELLULAR CARCINOMA BY TARGETING THE JAK-STAT3 SIGNALING PATHWAY

Mohan C D
Department of Studies in Molecular Biology, University of Mysore,
Manasagangotri, Mysore,

Signal transducer and activator of transcription 3 (STAT3) is a latent transcription factor that regulates expression of genes involved in cell proliferation and survival. STAT3 has emerged as a promising target for the design of therapeutics against cancer. In this report, we have investigated the effect of a new azaspirane (CIMO) against hepatocellular carcinoma (HCC) cells. CIMO suppresses proliferation of HCC cells by reducing both constitutive and inducible phosphorylation of JAK1, JAK2, and STAT3. CIMO inhibited the phosphorylation of STAT3Y705, but it had no effect on phosphorylation of STAT3S727. CIMO accumulates cells in sub-G1 and decreases the nuclear pool of STAT3 in HepG2 cells and thereby suppresses the expression of STAT3-targeted genes. Inhibition of STAT3 phosphorylation by CIMO and knockdown of STAT3 mRNA using siRNA transfection displayed a similar effect on the viability of HCC cells. Furthermore, CIMO significantly decreased the tumor development in an orthotopic HCC mouse model through the downmodulation of phospho-STAT3, Ki-67, and cleaved caspase-3 in tumor tissues.

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III

ABSTRACTS OF

SYMPOSIUM / INVITED LECTURES

Symposium I

Health care Technology: Bench to bedside and beyond

KEYNOTE ADDRESS

MATERNAL DIETARY FATTY ACIDS AND PLACENTAL ROLES IN HUMAN FETAL GROWTH AND DEVELOPMENT

Asim K. Duttaroy
Department of Nutrition, Institute of Basic Medical Sciences,
Faculty of Medicine, University of Oslo, Oslo, Norway
E.mail: a.k.duttaroy@medisin.uio.no

Fatty acids are essential for feto-placental growth and development. Maternal fatty acids and their metabolites are involved in every stage of pregnancy by supporting cell growth and development, cell signaling, and modulating other critical aspects of structural and functional processes. Early placentation process is critical for placental growth and function. Several fatty acids modulate angiogenesis as observed by increased tube formation and secretion of angiogenic growth factors in first-trimester human placental trophoblasts. Long-chain fatty acids stimulate angiogenesis in these cells via vascular endothelium growth factor (VEGF), angiopoietin-like protein 4 (ANGPTL4), fatty acid-binding proteins (FABPs), or eicosanoids. Inadequate placental angiogenesis and trophoblast invasion of the maternal decidua and uterine spiral arterioles leads to structural and functional deficiency of placenta, which contributes to preeclampsia, pre-term intrauterine growth restriction, and spontaneous abortion and also affects overall fetal growth and development. During the third trimester of pregnancy, placental preferential transport of maternal plasma long-chain polyunsaturated fatty acids is of critical importance for fetal growth and development. Fatty acids cross the placental microvillous and basal membranes by mainly via plasma membrane fatty acid transport system (FAT, FATP, p-FABPpm, & FFARs) and cytoplasmic FABPs. In this lecture, I will discuss the maternal dietary fatty acids, and placental transport and metabolism, and their roles in fetal growth and development.

IL-I.01: THE POSSIBILITY OF MARINE LECTINS AS POST-ANTIBODY DRUGS

Yasuhiro Ozeki
School of Sciences, Yokohama City University, Yokohama, Japan
E-mail: ozeki@yokohama-cu.ac.jp

Novel lectins named "MytiLec" and "SeviL" have been isolated and characterized from mussels, an important food and environmental indicator species found in the marine coastal areas of the world. MytiLec binds to the sugar moiety of globotriose (Gb3), an á-galactoside, leading to apoptosis of Gb3-expressing lymphoma cells. SeviL, on the other hand, binds to asialo-GM1, a ganglioside, leading to cell proliferation of leukocytes. Each lectin had a totally different primary structure (MytiLec, which has a quite novel amino acid sequence, on the other hand, SeviL, which has an amino acid sequence that belonged to Ricin B chain-family). However, both lectins were found to have the "â-trefoil fold" that was commonly found in interleukin-1, fibroblast growth factors and many glycosidases. In this session of the 107th Indian Science Congress, I will talk about: (I) Bi-functional lectin that acts for cell death and proliferation. (II) Mechanisms of cell growth by lectins by binding to glycans. (III) Designing of "Mitsuba-1", an artificial lectin modeled from a mussel lectin to develop the new lectin-drugs.

IL-I.02: MOLECULAR PROFILES OF CHEMO-TOLERANT TRIPLE NEGATIVE BREAST CARCINOMA: FUTURE THERAPEUTICS

Saimul Islam, Hemantika Dasgupta, Jayanta Chakrabarti and Chinmay Kumar Panda

Dept. of Oncogene Regulation, Chittaranjan National Cancer Institute, 37 S. P. Mukherjee Road, Kolkata 700 026
E.mail: ckpanda.cnci@gmail.com

Triple negative breast carcinoma (TNBC) is defined as reduced expression of Estrogen receptors (ER), Progesterone receptors (PR) and Epidermal growth factor receptor 2 (EGFR2/HER2). In India, its frequency is quite high (27-35%) compared to worldwide frequency of 15-20%. It is originated from less differentiated ductal cell of breast having less sensitive to general radiotherapy/chemotherapy. In advanced neoadjuvant chemotherapy (NACT) of TNBC pathological complete response (pCR) was seen in only 15-44% of patients. Thus, for better diagnostic, prognostic and therapeutic measures of the chemo-tolerant TNBC samples different cellular pathways associated with tumour development were analyzed in the samples. The pathways include WNT stem cell self renewal pathway, EGFR signalling and DNA damage response (DDR) pathways. In the chemo-tolerant TNBC samples, down regulation of WNT and EGFR pathways due to reduced expression of receptors (FZD7, LRP6 and EGFR) and up regulation of antagonists (SFRP1, SFRP2, DKK1, SH3GL2) were seen. On the other hand, up regulation of key regulatory genes of DDR pathway like BRCA1, BRCA2, FANCC, FANCD2, MLH1 and MSH2 were seen in the NACT samples. This has been validated in a TNBC cell line MDA-MB-231 using anthracycline anti-tumour antibiotics doxorubicin/nogalamycin. The up regulation of the antagonists has been seen to be due to their promoter hypomethylation and down regulation of DNMT1. The NACT patients with reduced expression of receptors and/or beta-catenin and high expression of antagonists of the pathways showed comparatively better prognosis. Thus, development of targeted therapy against the key regulators of the above pathways and epigenetic regulators has importance for better therapeutic measure of the disease.

IL-I.03: CELLULAR STRESS PROTEINS AS POTENTIAL TARGETS AND REPURPOSING OF DRUGS IN THE FIGHT AGAINST HIV/AIDS

Debashis Mitra

Laboratory for HIV Research, National Centre for Cell Science, Pune, India
Centre for DNA Fingerprinting and Diagnostics, Hyderabad, India
E mail: dmitra@nccs.res.in; dmitra@cdfd.org.in

Human immunodeficiency virus - 1 efficiently utilizes the host cellular machinery not only to complete its life cycle but also to escape the human immune system. Although the current antiviral therapeutic regimen for managing HIV infection has reduced death from AIDS-related diseases significantly, it is still not the ultimate answer for AIDS patients and there is a need to identify novel therapeutic strategies. As all the events of HIV life cycle are majorly regulated by a large number of cellular factors, thus targeting such factors in association with viral factors may give us an advantage in therapeutic strategy. Our studies to identify such cellular factors, inhibition of which may not affect the cellular physiology but at the same time inhibits virus infection and replication have led to identification of stress protein family members as potential targets. We have identified novel molecules inhibiting HIV-1 infection by targeting HSP90. Furthermore, in order to identify anti-HIV activity in existing therapeutic molecules or candidates, we have screened a library of pharmacologically active compounds, with known cellular targets and mechanisms of action, for their anti-HIV potential. Some of these molecules have shown potent anti-HIV activity at significantly low concentration. We have studied the anti-HIV activity of one such identified molecule in detail and have tried to identify the mechanism of inhibition. Our results till date indicate that the selected molecule inhibits HIV-1 at early stages of viral infection by modulating cellular stress proteins and NF-êB signalling pathway.

IL-I.04: ENTEROVIRUSES AND THEIR ASSOCIATION WITH ACUTE AND PERSISTENT GASTROINTESTINAL INFECTIONS AND DISEASES

C. Durga Rao
Department of Biology, SRM University, Amaravati, India 522502
E mail: cdrmcb@gmail.com

Diarrheal and other gastrointestinal diseases constitute a major cause of morbidity and mortality in infants and young children especially in the developing countries. Worldwide deaths among all ages due to diarrhea during 2015 was estimated to be about 1.31 million, diarrheal deaths in children below five years of age being 499,000. Rotavirus accounted for about 200,000 deaths. Mortality due to diarrhea decreased by approximately 21% from 2005 to 2015. Although diarrheal deaths decreased significantly during the last two decades, it still represents 3rd largest cause of infantile deaths. Several bacterial, viral, parasitic, fungal and non-infectious diarrhea causing agents have been identified. However, identification of a causative agent in 30-40% of diarrheal cases remained elusive. Although enteroviruses, majority of which are transmitted by fecal-oral route and replicate first in the intestinal cells before affecting the target organ, and have been reported to be associated with diarrhea in a few studies, their role in diarrhea in humans has not been recognized due to lack of systematic demonstration of their role in diarrhea and hence they remained unrecognized as a gastrointestinal pathogen. The purpose of this presentation is to emphasize the importance of enteroviruses to be considered as major gastrointestinal pathogens associated with acute and persistent diarrhea and non-diarrheal increased frequency of bowel movements (IFoBM-ND) in infants, young children and adults in view of the recent validation of Koch's postulates demonstrating the association of enteroviruses with diarrhea in newborn mice pups in our laboratory. Our studies and the subsequent studies from different countries should stimulate strategies for addressing the infantile gastrointestinal disease burden, which was hitherto remained unaddressed.

IL-I.05: A, B, CS, OF HEPATITIS: LIFE IN LIVER

Saumitra Das
National Institute of Biomedical Genomics, Kalyani
Microbiology and Cell Biology, Indian Institute of Science
E.mail: sdas@iisc.ac.in; director@nibmg.ac.in

Liver is the home for hepatitis viruses, where they multiply and cause tissue damage. Hepatitis virus infection hijacks the host machinery to cater to its living in the liver. What controls their life within the liver is our primary research interest. The major cause of viral hepatitis is the infection by several subtypes of hepatotrophic viruses–viz. Hepatitis A, B, C, D and E viruses. Myriads of studies have been conducted to evolve preventive as well as curative strategies, however, no vaccines are currently available except for hepatitis A and B.

Our laboratory primarily focuses on the hepatitis C virus (HCV) infection, which causes liver cirrhosis and often leads to hepatocellular carcinoma. HCV is a single-stranded RNA virus which upon infection delivers its positive stand RNA genome into the host cytoplasm. Following entry into the liver cells, translation of the viral RNA is the initial obligatory step for viral replication. The viral RNA translation is mediated by an 'internal ribosome entry site' (IRES) element present at the 5'-untranslated region of the RNA template. Ribosome binding to the HCV-IRES element is unique and fundamentally different from the cellular mRNA. It is influenced by several *trans*-acting host proteins and *cis*-acting elements on the HCV RNA.

We have been deciphering the molecular mechanisms of HCV life cycle and pathogenesis to identify novel targets. These are being exploited for rational designing of antiviral agents that can inhibit different steps of HCV infection. In parallel, we have developed a candidate vaccine against HCV, customized for Indian population.

Our journey towards understanding the Biology of Hepatitis C virus in past two decades will be discussed.

IL-I.06: PHAGE INSPIRED ANTIBIOTICS FOR MYCOBACTERIA

Sujoy K. Das Gupta, Sourabh Samaddar, Fatema Calcuttawallah, Apurba Sarkar and Shreya Ghosh
Department of Microbiology, Centenary Campus, Bose Institute, P-1/12 C.I.T. Scheme VII-M, Kolkata - 700054, India
E mail: sujoy@jcbose.ac.in

The mycobacterial disease tuberculosis (TB) remains a major scourge even today despite the fact that its causative agent *Mycobacterium tuberculosis* was discovered more than 100 years ago. There are multiple reasons for this, which includes association of the disease with AIDS, drug resistance, and inadequate host immune responses. Mycobacteriophages, are bacteriophages that infect mycobacteria and grow in them. Bacteriophages are known to be manipulative in nature, having evolved mechanisms by which they can tweak the metabolic pathways of their hosts in such a way that their own growth is preferred over that of their host. In short, the phenomenon is often referred to as 'host inactivation'. If the host bacterium happens to be a pathogen such as *M. tuberculosis*, then by investigating how a phage that infects it induces its inactivation, it may be possible to evolve some new strategy for controlling the disease caused by it, which in this particular case is TB.

We are investigating the mechanism by which a mycobacteriophage named D29 interacts with its mycobacterial host. The results obtained indicate that such interactions can lead to the induction of mycobacterial cell death through mechanisms that are reminescent of apoptosis. We also identified several phage proteins which when synthesized at a high level in mycobacteria can lead to cell death. One such protein, Gp50, a ribonucleotide reductase was found to bring about cell death by inducing a Thymine less state (TLD). Using this information we are trying to develop new drugs and drug targets for inactivating the TB pathogen *M. tuberculosis.*

IL-I.07: DETERMINANTS OF A RAPIDLY EVOLVING CHROMOSOMAL LOCUS - THE CENTROMERE

Kaustuv Sanyal
JNCASR, Bangalore
E mail: sanyal@jncasr.ac.in

Chromosome segregation is a high-fidelity process that requires timely and dynamic interactions between the centromere-kinetochore complex and the spindle microtubules. More than 100 proteins assemble on centromere DNA to form the kinetochore - the chromosomal attachment site of the spindle apparatus. A specialized centromere-specific histone, CENP-A, binds to centromere DNA to nucleate kinetochore formation in most eukaryotes. The process of centromere/kinetochore formation is intriguing since it helps cells to propagate critical information from the previous generation to reuse it for future episodes of chromosome segregation. Using several human and plant pathogenic fungal species as models to study centromere evolution, we discovered that centromeres show an unsually high level of structural and DNA sequence diversity. Comparative genomic analyses suggest that centromeres are also involved in chromosomal rearragements and karyotype evolution that might have led to speciation. While active centromeres, that are marked by CENP-A chromatin, are subject to position effects, some drifts around the site of centromere assembly is tolerated making it a malleable genetic locus. In case a native centromere is inactivated, occasionally neocentromeres come to the rescue. However, the site of neocentromere formation is elusive in organisms with centromeres that do not rely on the primary DNA sequence. It is also known that replication origins flanking centromeres not only advance the replication timing of centromeres but also enable in loading new CENP-A molecules in the budding yeast *Candida albicans*, whose centromeres exhibit epigenetic regulation. Hence, there is an intimate connection between the replication machinery and its role in centromere specification. We show that the pre-replication complex protein Orc4 is highly enriched at all centromeres in this organism marking it an essential component of functional centromeres. The genetic underpinning of this association will be discussed.

IL-I-08: STRUCTURE OF G57W VARIANT OF HUMAN ?S-CRYSTALLIN AND ITS INVOLVEMENT IN SEVERE INFANTILE CATARACTS

Kandala V.R. Chary
Indian Institute of Science Education and Research, Berhampur, 760010, India
chary@iiserbpr.ac.in; director@iiserbpr.ac.in

A recently identified G57W variant of human ?S-crystallin is associated with dominant infantile cataracts, the familial determinate of childhood blindness worldwide [1]. To investigate the structural and functional changes [2] that compromise eye lens transparency and cause lens opacification, we determined the high-resolution 3D structure of human ?S-G57W [3] and studied its conformational dynamics in comparison to its wild-type [4] by solution NMR spectroscopy. Consistent with differential domain dynamics, our results from H/D exchange NMR spectroscopy show sequential deprotection of foldons indicating presence of partially open conformations [5]. Site-specific conformational ruggedness is tuned from non-linear dependences of amide proton chemical shifts in human ?S-G57W upon thermal agitation [6]. This wholesome study provides a residue resolved approach to the structure-function paradigm as one shifts from physiology to pathology facing critical therapeutic consequences.

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[3] K. J. Bari et al., 2019. *J. Struct. Biol.* 205(3), 72-78.

[4] K. J. Bari et al., 2019. *Biochem. Biophys. Res. Commun.* 511(3), 679-684.

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IL-I.09: METABOLIC SWITCHING IN TUMOUR CELLS PROMOTES ADAPTATION, SURVIVABILITY AND ONCOGENESIS

Sib Sankar Roy
CSIR Indian Institute of Chemical Biology, 4, Raja S. C. Mullick Road, Kolkata-700032
Email: sibsankar@iicb.res.in

Increased metastasis and the recurrence contribute to the lethality of ovarian cancer (OC). Different types of molecular mechanisms including aberrant-splicing are directly or indirectly associated with the cancer progression. Several gene transcripts are differentially spliced in tumour cells, growth factor receptor, like FGFR gene is one of them. Tumour microenvironment (TME) influences cancer advancement by several mechanisms. Growth factors-mediated signaling events change metabolism and metastatic potential of cancer cells. Onco-metabolites, the products of re-oriented metabolism also plays important role in initiating signalling cascades helping further progression of the disease. Considering these events, we are trying to unfold the mechanisms of growth factor-mediated metabolic adaptations of cancer cells that lead to cancer advancement. We are also interested to know how onco-metabolites that are products of de-regulated metabolism aid oncogenesis. Our interesting findings suggest EGF treatment on epithelial cancer cells changes metabolic parameters, like glycolytic rate, glucose uptake as well as profiles of genes associated with metabolic activities. It also primes the cells towards mesenchymal switch. Mesenchymal phenotype prepares the cancer cells to evade new tissues and colonize at a distant site by a process called EMT. Different bio-energetic alterations in tumour cells in response to EGF increases various onco-metabolites, like lactate (Glycolytic end product of cancer cells), glutamine and Lysophosphatidic acid or LPA (oncolipid). These factors in turn promote tumour progression by influencing cancer metabolism as well as invasive properties. Taken together, our observations suggest a loop that maintains cancer associated characters and thereby enabling us to understand the dynamics of metabolic reshufflings and growth factor signaling aiding adaptive ability, survivability and progression of tumour cells.

IL-I.10: OMIC RESEARCH: A PATH TO IDENTIFY DISEASE BIOMARKER

B. P. Chatterjee
Department of Oncogene Regulation
Chittaranjan National Cancer Institute
Kolkata – 700 026
E mail: cbishnup@gmail.com

In recent years proteomics, glycoproteomics, phosphoproteomics and lectinomics have become an intensive field of research to define the biomarkers which could facilitate the early detection of disease and treatment. Proteins which undergo post translation modifications like glycosylation and phosphorylation are known to play vital role in diagnosis of liver diseases including liver cancer. The clinical relevance of aberrant glycosylation of N-linked glycoproteins in the sera of viral hepatitis B, liver cirrhosis and hepatocellular carcinoma patients studied to find glycan biomarker by glycan analysis tools like glycoproteomics and lectinomics will be a part of discussion. Phosphorylation is another post translation modification of proteins that occurs in disease process could be a choice of noninvasive biomarker. Gradual change in over expression of a particular phosphoprotein in hepatitis B, that induced liver cirrhosis and subsequently hepatocellular carcinoma observed by phosphoproteomics including MALDI-ToF and MS/MS will be discussed.

IL-I.11: BLOOD BASED PROTEIN MARKER OF HEAD & NECK SQUAMOUS CELL CARCINOMA AND THEIR THERAPEUTIC INTERVENTION

Sharmistha Dey
Department of Biophysics, All India Institute of Medical Sciences,
New Delhi - 110029, India
E mail: sharmistha_d@hotmail.com

The p38MAP kinases play a crucial role in the production of pro-inflammatory cytokines and over-expression of it increase cytokines which promote cancer. Among four isoforms, p38á has been well studied in Head and Neck Squamous Cell Carcinoma (HNSCC) and other cancers as a therapeutic target.p38ä has recently emerged as a potential disease-specific drug target. Elevated serum p38á level in HNSCC was reported earlier from our lab. This study aim to estimate the levels of p38MAPK-isoforms in the serum of HNSCC and design peptide inhibitor targeting the same Levels of p38MAPK-isoforms in the serum of HNSCC and healthy controls were quantified by surface plasmon resonance technology. The peptide inhibitor for p38MAPK was designed by molecular modeling using Grid-based Ligand Docking with Energetics tools and compared with known specific inhibitors. We have observed highly elevated levels of all four isoforms of p38MAPK in serum of HNSCC patients compared to the control group. Further, serum p38á, p38â and p38ä levels were down regulated after therapy in follow up patients, while p38ã showed no response to the therapy. Present study screened designed peptide as a specific inhibitor against p38MAPK. In this study, first time estimated the levels of p38MAPK-isoforms in the serum of HNSCC. It can be concluded that p38MAPK-isoforms can be a diagnostic and prognostic marker for HNSCC and potential therapeutic target.

IL-I.12: GLOBAL REGULATORY PATHWAYS TO DISCOVER, DEVELOP AND BRING MEDICINE TO MAN AND ACHIEVE COST-EFFECTIVE HEALTHCARE

G Krishna and P Roy
Parexel International, Bethesda, MD, USA
E mail: gopala.krishna@parexel.com; emailgk2017@gmail.com;

Bringing life-saving medicines to man is a complex process. Biotechnology products have historically proven their value as a basic resource in fulfilling the healthcare needs. These molecules primarily known to be of plant, animal, microorganism, and/or synthetic-origin with an enormous therapeutic potential. With the technological advancements in science and instrumentation and the promise of potential impact this field would have in the global healthcare industry, the stakeholders have come together and continue to do so in support of such an effort. The aim of this presentation is to review pertinent literature and to share hands-on experience of the authors to assist the potential users of such drug development information with customized pathways, so worthy medicines are brought cost-effectively, from bench to the bedside of the "waiting" patient and make a difference. To this end, as a first step, regulatory guidelines and strategy protocols have been made public by the global health authorities and scientific organizations. These include, e.g., International Council of Harmonization (ICH), World Health Organization (WHO), European Medicines Agency (EMA), Japanese Pharmaceuticals and Medical Devices Agency (PMDA), US Food and Drug Administration (FDA), Indian Central Drugs Standard Control Organization (CDSCO), Organization for Economic Cooperation and Development (OECD) and many more. Briefly, the drug development process includes identifying a worthy molecule using high-throughput screening, pharmacological models, safety assessment in toxicity studies, filing investigational new drug application (IND), conducting extensive clinical trials in healthy volunteers and patients and filing new drug application (NDA) for marketing authorization. Depending on the type of drug and indication, several accelerated pathways may be sought for regulatory approval to bring medicines sooner than standard time to the patient.

Keywords: Drug development; healthcare; biotechnology; regulatory guidelines; botanicals; nutraceuticals

IL-I.13: ASSOCIATION OF CD14 C-159T PROMOTER POLYMORPHISM WITH REGULATORY CYTOKINE RESPONSE IN INDIAN CHILDREN INCLUDING BIRTH COHORT OF BABIES WITH ATOPIC ASTHMA

Amit Agarwal, Anil Chauhan, Manvi Singh, BP Chatterjee and Meenu Singh
PGIMER, Chandigarh
E mail: agarwal.amit1982@gmail.com

Background: C-159T polymorphism in the CD14 gene has been suggested in susceptibility to asthma. CD14 is a multifunctional receptor endotoxin, which is expressed on the surface of macrophages, monocytes and neutrophills. It is likely to play a role in the inflammation pathway. Though data is available regarding association of CD14 gene with asthma but independent studies are in conflict. The present study was conducted to examine the association of promoter C-159T single nucleotide polymorphism (SNP) in the CD14 gene for Indian children with atopic asthma.

Methods: We characterize the C-159T polymorphism in children with asthma (50), cohort group (20) and healthy control group (50) by PCR-RFLP. Association analysis was performed using $\div^2$ tests. We also analyzed the association of CD14 (C-159T) with total IgE levels by ELISA

Results: In this SNP a 497-base pair (bp) PCR product was generated using the standard primers. After restriction products showed that homozygous C allele was appeared as a single 497-bp band, the homozygous T allele as bands of 144 bp and 353 bp, and heterozygous exhibits all three bands (144, 353 and 497 bp). The OR of CC genotype frequency was 0.84 in study group and 0.78 in cohort group and the OR of C allele frequency was 2.38 in study group and 2.52 in cohort group. Total IgE level were found to be significantly higher in CC genotype compared to CT and TT genotype.

Conclusion: The present study concludes that in CD14 gene polymorphism CC genotype was not significantly associated with asthma but other factorsi.e. total IgE showed significant association of CC genotype with asthma. On the other hand, there was significant association of C allele with asthma.

IL-I.14: MILK EXOSOMAL MIRNAS: NOVEL DIETARY CELL REGULATOR IN HEALTH AND DISEASES

Dheer Singh, Payal Rani, Monika Vashisth, & Suneel Kumar Onteru
Molecular Endocrinology and Functional Genomics Laboratory, Animal Biochemistry Division, ICAR-National Dairy Research Institute, Karnal-132001, Haryana, India
E mail: drdheer.singh@gmail.com

Exosomes are the lipid bilayered nano-vesicles present in the milk and are being proposed as the cargo of bioactive component of milk. They encapsulate various biomolecules including miRNA as their cargo. These exosomes can integrate into the host cell to affect the target cell environment via transferring its miRNAs which further functions via regulating gene expression. We have recently profiled cow and buffalo milk exosomal miRNA and functionally validated few of abundant miRNA. Adding to the physiological functionality of milk exosomal miRNAs, we have also demonstrated that these miRNAs resist the harsh digestive processes and can be bioavailable. This indicates that these miRNAs may be incorporated in the body and affect the physiology. Most of the milk exosomal miRNAs reported have been implicated in regulating crucial cellular processes and diseases. Abundant milk exosomal miRNAs like miR-148a, miR-21, miR-125b and miR-30 family have been involved in regulating the crucial immune responses including innate and adaptive immunity. Also, many of the milk miRNAs have been involved in the pathophysiology of autoimmune diseases. miRNAs like miR-200a, miR-29a, miR-34a, miR-21 and let-7e are known to be the principal miRNAs involved in the pancreatic â-cell function which are abundant in milk exosomes and can be implicated in diabetes. miR-29 and miR-34 are implicated in Alzheimer's and Parkinson's

disease abundantly present in milk exosomes indicating their involvement in the development of neurodegenerative diseases. Therefore, milk miRNAs may be bioavailable, may enter into the blood circulation and may affect the gene expression in the host body, influencing the overall health and pathophysiology of the diseases.

IL-I.15: RHEUMATOID ARTHRITIS INCREASES THE RISK OF HEART DISEASE: PROTEOMIC STUDIES

Sagarika Biswas
CSIR-Institute of Genomics & Integrative Biology, Mall Road, Delhi-110007
E mail: Sagarika.biswas@igib.res.in

An increased understanding in the etiopathophysiology of chronic inflammatory diseases, such as rheumatoid arthritis (RA) and Coronary artery disease (CAD) reveals that the inflammation in RA and heart disease is very similar and is common problem for both the disease. The patients suffering from RA generally doubles the risk of atherosclerosis and heart failure. RA and CAD related risk factors including various common pro-inflammatory cytokines are most prominent paradigm for suppression or lowering the inflammation and disease progression. RA is affecting approximately 1% of the adult population with 3:1 female to male ratio whereas 17.7 million people are majorly affected by cardiovascular diseases (CVD). Although progress is being made, preventing or reducing heart disease, risk in people with RA remains challenging. Currently, there is no potential and specific clinical protein marker either for RA or for CAD diagnosis. Therefore, identification of disease specific biomarkers by studying the differentially expressed proteins (DEPs) using proteomic approach can be vital to account early-onset of RA and CVD. The diagnosis at an early stage of diseases can allow us a successful treatment, whereas delays can impede that treatment due to late stage of disease presentation.

Therefore, the present study aimed to identify DEPs based-upon plasma proteome profiling of RA and CAD patients compared to healthy control using an iTRAQ based LC-MS/MS technique. The disease specific DEPs was validated by Western blotting, ELISA, FACS.

To understand the DEPs, collagen induced arthritic (CIA) model and high fat diet model has been generated to study the effect of few medicinal extract in RA and CAD respectively. In conclusion, understanding the pathogenic functional implications of DEPs of RA and CVD might helpful in identification of novel therapeutic targets for the prevention and treatment of diseases.

IL-I.16: MOLECULAR DETECTION OF TWO MAJOR MUTATIONS CAUSING TWO GENETIC DISEASES, BETA THALASSEMIA AND CYSTIC FIBROSIS

Pranab Roy
Institute of Child Health, Kolkata – 700017, India
E mail: pranabroy@rediffmail.com

Genetic diseases caused by point mutations or deletion of nucleotides in the genes which affect the phenotype of the carrier have been studied for the last fifty years or more. We have taken two relatively common genetic disorders, beta thalassemia and cystic fibrosis which are autosomal recessive and are well studied for the genes involved. Beta globin gene having three exons and two introns may carry a number of point mutations and deletion giving rise to partial or total loss of functional beta globin protein. The most common of these mutations is IVS I-5 (C>G) which is a single base change at the 5th nucleotide in the intervening sequence I of beta globin gene. Screening of a large number of beta major and beta minor patients reveal that this mutation accounts for > 50% of all the mutations for beta thalassemia in India. HPLC analysis of the whole blood shows the abnormal globin proteins and is indicative of the status of the thalassemia, beta major (Homozygous) or beta minor (Heterozygous) traits. We have used a Real Time PCR based method for detecting the IVS I-5 mutation called ARMS PCR, which relies on the specificity of the primer binding to the genomic DNA of the patient. The wild type primer should amplify only with wild type genomic template and the mutant primer should amplify with the corresponding mutant genomic template DNA. The fluorescence obtained for the amplicons intercalating with the dye SyBr

Green is recorded in RT-PCR instrument. Analysing almost 25 samples characterized by HPLC for the IVS I-5 mutation revealed most of the carriers to be with this point mutation. Similarly, the gene involved in cystic fibrosis, CFTR (Cystic Fibrosis Transmembrane Conductance Regulator) is known to carry almost 1900 mutations in the gene with 24 exons, however almost 50% of all the mutations are the deletion at the 508th codon for phenyl alanine (DelF508). As the membrane protein CFTR is involved in Chloride ion transport in the membrane, the measurement of sweat chloride is indicative of cystic fibrosis, if the value is greater than 30 meq/litre. Here also, ARMS PCR with primers specific for the wild type and the mutant primers in parallel tubes with a common antisense primer reveal the zygosity of the template DNA. Comparison of the data with those obtained by a different technique (MALDI-TOF) in a different lab showed almost 90% agreement in the result.

IL-I.17: TRIPLEX-FORMING OLIGONUCLEOTIDES (TFO) TARGETED TO HMGB1 GENE SHOWS ANTIPROLFERATIVE EFFECT IN HUMAN HEPATOMA CELLS

Moganty R. Rajeswari* and Neelam Lohani
Department of Biochemistry, All India Institute of Medical Sciences, New Delhi, India
E mail: rajeswari3011@hotmail.com

The high mobility group box 1(hmgb1) is one of the frequently over-expressed genes whose aberrant expression is reported in a number of human cancers. Various strategies are underway to inhibit hmgb1 expression in cancer cells having considerable therapeutic value. The present work involves selective transcriptional inhibition of *hmgb1* gene using selective DNA triplex structure based gene technology. Here, the promoter region of the hmgb1 gene at position (-183 to -165) from transcription start site as target was selected using bioinformatic tools. The DNA triplex formation by the DNA of target gene and TFO was confirmed using UV VIS absorption spectroscopy, Circular Dichroism and Isothermal Calorimetry. Treatment of HepG2 cell with specific Triplex Forming Oligonucleotide (specific TFO) significantly down regulated HMGB1 expression level at mRNA and protein levels by 50%, while the classical anticancer drugs, actinomycin/ adriamycin as positive controls showed 65% and

the combination of TFO and drug decreased by 70%. The anti-proliferative effects of TFO correlated well with the fact of accumulation of cells in Go phase and apoptotic cell death. Further, the binding of anticancer drugs to hmgb1 are stronger in DNA triplex state as compared to hmgb1 alone, suggesting the combination therapy as a better option. Therefore, the ability of *hmgb1* targeted triplex forming oligonucleotide in combination with triplex selective anticancer drug holds promise in the treatment of malignancies associated with *hmgb1* overexpression. The result obtained may open up new vistas to provide a basis for the rational drug design and searching for high-affinity ligands with a high triplex selectivity.

IL-I.18: ALTERNATIVE APPROACHES FOR DIAGNOSTICS AND THERAPEUTICS AGAINST TUBERCULOSIS

Somdeb Bose Dasgupta
Department of Biotechnology
Indian Institute of Technology Kharagpur
E mail: somdeb@iitkgp.ac.in

Tuberculosis (TB) caused by *Mycobacterium tuberculosis*, is one of the top five causes of mortality worldwide and more so with the advent of drug resistance. India harbors one-fifth of the global TB burden of which forty percent are infected with extreme or total drug resistant mycobacteria. Besides it is also believed that one-third of Indian population is affected with latent TB a ticking time bomb in context of TB immunity. Hence there is an ardent need of point-of-care diagnostics for latent TB and drug resistance status of active TB patients. Hence our lab is engaged in developing a lateral flow assay based non-invasive detection of latent TB from urine samples. SELEX mediated aptamers are being developed against latent TB specific signature peptides present in urine. In another study we are developing an isothermal amplification, in vitro transcription based detection of drug resistance specific genetic locus mutations using specific morpholinos. Specific binding of morpholinos immobilized on biosensor chips would produce an impedance on binding to amplified mutated genetic loci and thus indicate the extent of resistance in point-of-care settings unlike GeneXpert-Rif. In context of therapeutics we have envisaged on host-directed therapeutics

unlike the common practice of screening for anti-mycobacterials as the later would in long run add to the resistance burden. We are developing a immunomodulatory drug encapsulated, surface-functionalized pro-drug constituted nanocapsule that would trigger a pro-inflammatory response and re-enable the infected macrophages to kill the bug within. Taken together or study perfectly aligns with from the bench to bedside objective.

IL-I.19: EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR): A POTENT REGULATOR OF MATRIX METALLOPROTEINASES (MMPS) AND TUMOUR INVASION IN BREAST CANCER

Aniruddha Banerji
St. Xavier's College (Autonomous),
30 Mother Teresa Sarani, Kolkata 700016, West Bengal, India
E mail: aniruddha_banerji@yahoo.co.in

Breast cancer is a leading cause of cancer related deaths worldwide. As many breast cancers show elevated epidermal growth factor receptor (EGFR) expression and phosphorylation, the role of EGFR in breast cancers was studied using the invasive human breast ductal carcinoma cell line MCF-7 and the invasive human breast adenocarcinoma cell line MDA-MB-231 as models. Interaction of EGFR with its ligand epidermal growth factor (EGF) promoted signalling through focal adhesion kinase (FAK) and phosphatidylinositol 3'kinase (PI3K) leading to significantly increased expression and activity of matrix metalloproteinase-2 (MMP-2) and matrix metalloproteinase-9 (MMP-9), significantly increased expression of membrane type-1 matrix metalloproteinase (MT1-MMP) and appreciably decreased expression of the endogenous MMP inhibitor, tissue inhibitor of metalloproteinases-2 (TIMP-2). The invasive potential of breast cancer cells was also significantly increased. As MMP-2, MMP-9 and MT1-MMP play crucial roles in promoting tumour invasion, their upregulation upon interactions of cells with EGF could increase the aggressiveness of tumours and be a cause for the poor prognosis which is observed upon elevated EGFR expression in breast

cancers. When EGFR-ligand interactions were inhibited by treatment with anti-EGFR antibodies or anti-tumorigenic natural compounds like curcumin, EGFR mediated signalling through FAK and PI3K were hindered and EGFR mediated upregulation of MMP expression and activity and tumour cell invasion were significantly inhibited. Thus, targeting EGFR-EGF interactions may render tumours less invasive, improve prognosis and be of importance in clinical management of breast cancers with aberrant EGFR activity.

Keywords: breast cancer, epidermal growth factor receptor (EGFR), matrix metalloproteinase-2 (MMP-2), matrix metalloproteinase-9 (MMP-9), membrane type-1 matrix metalloproteinase (MT1-MMP), phosphatidylinositol 32 kinase (PI3K)

IL-I.20: DIACEREIN-MEDIATED INHIBITION OF IL-6/IL-6R SIGNALING INDUCES APOPTOTIC EFFECTS ON BREAST CANCER

Mahitosh Mandal
School of Medical Science and Technology, Indian Institute of Technology, Kharagpur 721302, West Bengal, India
E mail: mahitosh@smst.iitkgp.ac.in

Interleukin-6 (IL-6) signaling network has been implicated in oncogenic transformations making it attractive target for the discovery of novel cancer therapeutics. In this study, potent antiproliferative and apoptotic effect of diacerein were observed against breast cancer. In vitro apoptosis was induced by this drug in breast cancer cells as verified by increased sub-G1 population, LIVE/DEAD assay, cell cytotoxicity and presence of terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL)-positive cells, as well as downregulation of antiapoptotic proteins Bcl-2 and Bcl-xL and upregulation of apoptotic protein Bax. In addition, apoptosis induction was found to be caspase dependent. Further molecular investigations indicated that diacerein instigated apoptosis was associated with inhibition of IL-6/IL-6R autocrine signaling axis. Suppression of STAT3, MAPK and Akt pathways were also observed as a consequence of diacerein-mediated upstream inhibition

of IL-6/IL-6R. Fluorescence study and western blot analysis revealed cytosolic accumulation of STAT3 in diacerein-treated cells. The docking study showed diacerein/IL-6R interaction that was further validated by competitive binding assay and isothermal titration calorimetry. Most interestingly, it was found that diacerein considerably suppressed tumor growth in MDA-MB-231 xenograft model. The in vivo antitumor effect was correlated with decreased proliferation (Ki-67), increased apoptosis (TUNEL) and inhibition of IL-6/IL-6R-mediated STAT3, MAPK and Akt pathway in tumor remnants. Taken together, diacerein offered a novel blueprint for cancer therapy by hampering IL-6/IL-6R/STAT3/MAPK/Akt network.

IL-I.21: AN INSIGHT INTO THE MECHANISM OF DNA STRAND ANNEALING BY HUMAN RECQ1 HELICASE

Swagata Mukhopadhyay, Tulika Das, Amit K. Das and Agneyo Ganguly
Department of Biotechnology
Indian Institute of Technology Kharagpur, Kharagpur 721302
E mail: agneyo@iitkgp.ac.in

RecQ1 is the shortest and the first one to be identified among the five RecQ helicases available in humans. RecQ1 protein comprises of two recA like domains, a zinc binding domain and a signature RecQ C-terminal domain containing the winged helix (WH). Apart from its ability to unwind a wide variety of DNA substrates, this helicase possess a ATP independent strand annealing activity. The mechanism of strand annealing by RecQ helicases is poorly understood till date. Crystal structures and biochemical data from earlier studies suggests that the C-terminal domain might have significant role in strand annealing. The isolated winged helix (WH) domain of human RecQ1 have been shown to efficiently catalyze strand annealing in vitro. Mutations on the tip of a â-hairpin present in the WH domain and the flanking residues have been shown to abolish unwinding activity. Surprisingly the same mutations on the beta hairpin structure of an annealing incompetent RecQ1 mutant were reported to restore the annealing activity. Using a wide range of biochemical and biophysical techniques we have tried to delineate the strand annealing mechanism of human RecQ1. We

have crystallized a truncated fragment of human RecQ1 containing mutations in the WH domain. From our crystal structure data and interface analysis we have identified potential interactions between residues in Zn binding domain and WH domain that might play significant role in attenuating strand annealing activity. Mutations on either beta hairpin or on the alpha helix is found to restore strand annealing of the annealing incompetent mutant of RecQ1.We hypothesize that these mutations might disrupt the inter domain interactions and impart flexibility to the winged helix domain thereby offering a more favourable conformation for strand annealing. Overall our study provides insight into the conformational requirements of the RecQ C-terminal domain for efficient strand annealing by human RecQ1.

Symposium II

Agricultural Biotechnology: Science for Lab to land.

IL-II-01: THE INTER-REGULATION OF MYC2 WITH OTHER TRANSCRIPTION FACTORS TO CONTROL PLANT GROWTH AND DEVELOPMENT

Sudip Chattopadhyay
National Institute of Technology Durgapur, Department of Biotechnology, Durgapur 713209
E mail: sudipchatto@gmail.com, sudip.chattopadhyay@bt.nitdgp.ac.in

Light arguably is the most important factor for plant growth and development. In the absence of light, seedlings have elongated hypocotyl and closed cotyledons with apical hooks, designated as skotomorphogenic growth. However, the light grown seedlings cease rapid elongation of hypocotyl, initiates cotyledon expansion with chlorophyll accumulation, designated as photomorphogenic growth. Transcriptional regulatory network downstream to photoreceptors plays a key role in mediating light signal through the coordinated activation and repression of a fairly large number of regulatory genes during photomorphogenesis.

MYC2, a bHLH transcription factor, plays a crucial role for growth and development in Arabidopsis and tomato plants. MYC2 works as a negative regulator of photomorphogenic growth and works in a concerted manner with CAM7 and HY5, two other transcription factors in the light signaling pathways. MYC2 works in a feedback regulatory loop in the regulation of MKK3-MPK6-MYC2 module to turn off the MAP kinase signaling pathways. Recent studies have revealed that whereas CAM7 and HY5 promote the expression of *HY5*, MYC2 attenuates the expression of *HY5* by binding to its promoter. The concerted regulatory roles of these transcription factors in the regulation of *HY5* expression and thereby growth and development of plant will be discussed. It will also be discussed that how MYC2 is able to promote plant growth and development in transgenic tomato plants with altered level of expression.

IL-II-02: MOLECULAR INSIGHTS INTO ORGANELLER CONTROL OF CHITOSAN TRIGGERED IMMUNITY: TURNING KNOWLEDGE INTO INNOVATION

Subhra Chakraborty
National Institute of Plant Genome Research, Aruna Asaf Ali Marg,
New Delhi-110067, India
Email: subhrac@hotmail.com, schakraborty@nipgr.ac.in

Impending changes in the global climate coupled with increased frequency of high complexity diseases have resulted in challenges related to food and nutrition. Morbidity and mortality associated with fungal infections and emergence of resistant fungal strains necessitate study of fungal pathogenesis and host innate immunity. *Fusarium oxysporum*, a medically and agronomically important multi-host fungal pathogen is known to be associated with neuronal stress in humans and vascular wilt in plants, while Fusarium-mediated killing of worm has recently been described. Chitin oligosaccharides, the deacetylated form of chitin, act as archetypal general elicitors and typical fungal MAMPs that induce defense responses in a broad host range, including plants, insects, mice and humans suggesting the shared occurrence of chitin-mediated defense machinery in higher eukaryotes. Although chitosan is a known MAMP implicated in defense, the precise mechanism of chitosan-triggered immunity (CTI) remains unknown. Extracellular matrix (ECM) is the unique organelle that perceives stress signals and reprograms molecular events while nucleus, the regulatory hub serves as modulator of such signaling events dictating cell fate decisions. Our understanding of how ECM and nucleus dictates immunity is largely unknown. To elucidate regulatory framework of Fusarium-associated disease and immune response, we analyzed the gene and protein expression during infection, integrated temporal expressions and network analysis with genetic inactivation data in worm and plant. Longitudinal spatiotemporal multiomics analyses and the derived biomolecular networks revealed organ and organelle function in contrasting genotypes and diverse kingdoms during fungal invasion. Cumulative data led to the discovery of chitosan-responsive networks that cause significant extracellular matrix (ECM) and guard cell

remodeling and translate ECM cues into cell fate decisions during fusariosis. Finally, this study for the first time provides novel insights on host-specific immune signaling that impinge upon the surveillance mechanism of innate immunity in multi-host pathogen response and facilitated discovery of cellular therapeutic targets for Fusarium-associated disease.

IL-II-03: INTEGRATION OF DEVELOPMENTAL AND ENVIRONMENTAL SIGNALS IN PLANT GROWTH PLASTICITY

Krishna Reddy Challa, Pooja Aggarwal and Utpal Nath
Department of Microbiology and Cell Biology, Indian Institute of Science, Bangalore 560012, India
E mail: utpalnath@iisc.ac.in

Plant growth is influenced by both developmental and environmental factors, and the effects of these endogenous and exogenous factors are integrated by major phytohormones such as auxin and brassinosteroid. Although the biosynthetic pathways that generate these hormones and their downstream signaling mechanisms have been extensively studied, the upstream transcriptional network that modulates their levels and connects their action to cell morphogenesis is less clear. We have found that the miR319-regulated TCP (TEOSINTE BRANCHED1, CYCLODEA, PROLIFERATING CELL FACTORS) transcription factors, notably TCP4, directly activate the transcription of *YUCCA5*, an auxin biosynthetic gene, and integrate the auxin response to a brassinosteroid-dependent molecular circuit that promotes cell elongation in *Arabidopsis thaliana*. Further, TCP4 modulates the common transcriptional network downstream to auxin-brassinosteroid signaling, which is also triggered by environmental cues, such as light, to promote cell expansion. Our study links TCP function with the hormone response during cell morphogenesis and shows that developmental and environmental signals converge on a common transcriptional network to promote cell elongation.

IL-II-04: IDENTIFICATION AND UTILIZATION OF ELITE ALLELES OF ABCC1 AND PAP10A GENE IN DEVELOPMENT OF LOW ARSENIC ACCUMULATING P-DEFICIENCY TOLERANT RICE

Somnath Bhattacharyya, Sen Subhrajyoti, Sen Poulomi, Das Dibakar, Purkayastha Shampa

Crop Research Unit, Department of Genetics and Plant Breeding, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal PIN 741252

Correspondence E mail: somnathbhat@yahoo.com

Rice plays leading role in contributing arsenic intake by human through dietary exposure. It is not due to the fact that rice is the highest accumulator among all the crops but rice is the staple food of the vast area where groundwater is contaminated with arsenic. It is not at all a realistic proposition for filtering a huge amount of water before applying into the field. Therefore, selection of rice cultivars with low arsenic is an effective approach for reducing the arsenic contamination in rice. Arsenic usually enters into rice root through phosphate and silicon transporters. P-deficiency tolerant aromatic rice lines are identified as low accumulator of arsenic also. A Bengal aromatic land race, Gobindabhog carries both elite alleles of P-deficiency tolerance purple acid phosphatase 10a (OsPAP10a) and low arsenic accumulating OsABCC1 genes. Alleles are considered elite because of their higher relative abundance of transcript, higher acid phosphatase activities in presence of arsenic and absence of phosphate respectively. Allele specific markers of these two genes identified and validated in a set of 100 rice genotypes as well as 180 RILs. Elite ABCC1 allele carrying rice lines reduce 50% arsenic accumulation in grain and favourable allele of PAP10a gene improves rice yield, particularly, when grown on acid soil of red and lateritic tract of Bengal by higher exudation of acid phosphatase. A high yielding elite PAP10a carrying rice variety is also released for the cultivation in West Bengal.

IL-II-05: IMPROVING CROP PRODUCTIVITY WITH LESS WATER: HOW A COMBINATION OF HIGH THROUGHPUT PHENOTYPING WITH MULTI-OMICS APPROACH HELP DEVELOP SUITABLE CULTIVARS OF RICE

MS Sheshshayee, Prathibha MD., Preethi NV., Pushpa D., Raju BR., Mohankumar MV., Remegowda HV and Udauakumar M.
Department of Crop Physiology, University of Agricultural Sciences, GKVK Campus, Bengaluru-560 065, Karnataka
E mail- msshesh1@uasbangalore.edu.in

Can plant physiology contribute to sustaining crop yields with less resources? Breeding for improved grain yield with less water was achieved to a small extent through a selection of high yielding varieties under resource limiting conditions. There are two daunting challenges, one, how to sustain productivity while saving water? Second, what should be the approach to introgress physiological traits to achieve this? Therefore, there is a need to develop high throughput phenotyping strategies to capture genetic variability and explore the possibilities of utilizing the power of Multi-Omic approaches for introgressing these traits into an elite genetic background to enhance water productivity.

We screened a panel of rice germplasm accessions for variability in specific constitutive traits like Water use efficiency and root traits and acquired tolerance traits. Stable isotopes techniques were developed to capture genetic variability constitutive traits while a temperature induction response was developed to screen for acquired tolerance traits. A non-targeted metabolomics approach was adopted to identify specific molecules that get upregulated when the acquired tolerance needs to be improved. An SSR marker based approach was adopted to identify specific markers through Association mapping. These markers were used to introgress each of these traits into an elite rice cultivar IR64. The resulatant trait introgressed lines (TILs) showed significant increase in grain yield and saved more than 60% water.

We report a first concerted and focused effort to utilize the powers of genomics, metabolomics Phenomics and marker assisted multi-parent backcrossing to enhance Rice productivity while saving substantial volumes of water.

IL-II-06: EFFECT OF HIGH TEMPERATURE AND DROUGHT STRESS DURING EARLY REPRODUCTIVE STAGE ON POLLEN DEVELOPMENT AND ITS APPLICATION IN CROP IMPROVEMENT

R L Ravikumar, Ashutosh Singh and K J Meghana
Department of Plant Biotechnology, University of Agricultural Sciences, Bengaluru 560065
E mail: rlravikumar@rediffmail.com

Among the various environmental stress factors low drought and high temperature affect survival, growth and potential yield of crop plants. The breeding for drought and high temperature stress tolerance continues to be a challenge because severity, timing and duration of drought vary from year to year and location to location. Therefore, the progress with empirical breeding dependent on individual trait and yield based selections has not kept up with expectations. The plant male reproductive development is very sensitive to environmental factors. The failure to set seeds has mainly been attributed to the high sensitivity of developing anthers and pollen grains. The plant requires genetic resources to adjust the reproductive growth. Even mild stresses such as drought or high temperatures applied during early phases of floret development irreversibly affect microsporogenesis, resulting in high levels of microspore abortion and associated induction of male sterility. Summarizing the environmental contexts where microspores/pollen quality and quantity can be found as the final outcome of tolerance to different conditions faced. The genotype dependent response to high temperature and drought in the quality and quantity of pollen grains produced has been reported in maize. The same can be used as an indirect strategy for genotype selection which has been demonstrated in many cereal crops. Further, it was observed that the pollen tolerance was

depended on the alleles present in them which can be exploited for selective fertilization in crop breeding programs to enhance the frequency of tolerant plants in breeding populations. A large number of transcriptome analyses have been undertaken in different crop plants to shed light on the genes involved in the essential steps of pollen formation and the male gametophyte specific genes were identified. Understanding the effect of abiotic stresses on the expression of these genes will be useful for identification of candidate genes responsible for abiotic stress tolerance to develop resistance in plants. An attempt also has been made to study the effect of stress during early reproductive stage on the expression of selected genes in tolerant and susceptible genotypes.

Keywords: Maize; drought; high temperature stress; pollen selection; microsporogenesis; gene expression.

IL-II-07: METABOLIC FINGERPRINTING OF *WITHANIA SOMNIFERA* LEAF AND ROOT USING GC–MS, HPLC AND NMR SPECTROSCOPY

Sandipan Chatterjee
RCED-Kolkata, CSIR- Central Leather Research Institute,
3/1C, Matheswartala Road, Kolkata 700046
E mail: sandipan.clri@gmail.com;

Profiling of metabolites is a rapidly expanding area of research for resolving metabolic pathways. Metabolic fingerprinting in medicinally important plants is critical to establishing the quality of herbal medicines. In the present study, metabolic profiling of crude extracts of leaf and root of *Withania somnifera* (Ashwagandha), an important medicinal plant of Indian system of medicine was carried out using NMR and chromatographic (HPLC and GC–MS) techniques. A total of 62 major and minor primary and secondary metabolites from leaves and 48 from roots were unambiguously identified. Twenty-nine of these were common to the two tissues. These included fatty acids, organic acids, amino acids, sugars and sterol based compounds. Eleven bioactive sterol–lactone molecules were also identified. Twenty-seven of the identified metabolites were quantified. Highly significant qualitative and quantitative differences were noticed between the leaf and root tissues, particularly with respect to the secondary metabolites.

107TH INDIAN SCIENCE CONGRESS

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IV

ABSTRACTS OF ORAL PRESENTATIONS

Symposium-I: Health care Technology: Bench to bedside and beyond.

OP-I.01: POTENT HIV-1 REVERSE TRANSCRIPTASE ACTIVITY PUNICALAGIN, A NOVEL TANNIN COMPONENT ISOLATED FROM *TERMINALIA CHEBULA* RITZ

Estari Mamidala[1] and Swapna Gurrapu[2]
[1,2] *Infectious Diseases Research Lab, Department of Zoology, Kakatiya University, Warangal-506009 Telangana State*
Email: drestari@kakatiya.ac.in

Reverse transcriptase (RT) is a viral enzyme and one of the main targets for drugs against human immunodeficiency virus (HIV). The aim of this study was to evaluate punicalagin, a novel tannin component isolated from *Terminalia chebula* Ritz against HIV-1 Reverse Transcriptase.The crude extracts were prepared from dried seeds of *Terminalia chebula* in methanol by maceration method and isolated a novel tannin component by using column chromatography and HPLC. *In vitro* HIV-1 RT inhibition activity was determined by HIV-1 RT capture elisa test. Isolated compound was identified as tannin, punicalagin, a novel compound. The anti-HIV activity was tested with PBMC and punicalagin showed HIV reverse transcriptase inhibitory activity and it was more effective than standard drug AZT. In PBMC cells, at 100 µM, punicalagin inhibited >91% of HIV-1 RT with IC_{50} 88.32 µM. The positive control (AZT) inhibited >87% of HIV-1 RT. Such studies will provide the solid biological foundation for translational research, which is needed to evaluate the *in vivo* activity of a Punicalagin, novel tannin component.

Key Words: HIV-1, Punicalagin, Tannin, Terminalia chebula

OP-I.02: ANTI-ANGIOGENIC POTENTIAL OF SILVER NANOPARTICLES SYNTHESIZED FROM AN ENDOPHYTIC FUNGUS *ASPERGILLUS NOMIUS* FC11AY1 AND ITS BIOACTIVITIES

Vellingiri Manon Mani[1&2*†], Arockiam Jeyasundar Parimala Gnana Soundari[2&3†]

[1]Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Coimbatore- 641402, Tamil Nadu, India

[2]Department of Microbial Biotechnology, Bharathiar University, Coimbatore- 641046, Tamil Nadu, India

[3]Department of Environmental Science and Engineering, College of Natural Resources and Environment, North West A&F University, Yangling, Shaanxi - 712100, China.

† Both the authors contributed equally

** Corresponding author*

Email: *manonmanisathee12@gmail.com*

Natural products from microbes and plants are playing a leading role in cancer drug discovery resulting in a large number of clinically useful bio- products. In contrary, the investigations of fungal nanoparticles and their derivatives have t led to a clinical cancer drug in spite of significant research efforts revealing a large number of fungi-derived natural products with promising anticancer activity. Many of these bio- nanoparticles have displayed notable *in vitro* growth-inhibitory properties in human cancer cell lines and select NP's have been demonstrated to provide therapeutic benefits in mouse models of human cancer. Many of these compounds are expected to enter human clinical trials in the near future. The present investigation targets to develop a potential silver nanoparticles from an endophytic fungus *Aspergillus nomius* FC11AY1 isolated from *Aegle marmelos* near Western Ghats regions. The endophyte exhibited the highest antagonistic and antioxidant activities. On this view, the silver nanoparticles were synthesized from the endophytic fungus and elucidated to be silver nanoparticle from the results of SEM, EDX, FT- IR and XRD. The synthesized nanoparticles

were assessed for antimicrobial and antioxidant assays; on which the AgNPs manifested maxium activity at minimum concentration. Further, the AgNP's were tested for anti-angiogenic potential in cancer cells through HET- CAM testing. The maximum number of blood vessels were inhibited by the AgNP's. In future, the synthesized NP's will be assessed for *in vivo* testing.

Keywords: *Aspergillus nomius,* antioxidants, angiogenesis endophytic fungus, silver nanoparticles.

OP-I.03: MOLECULAR CHARACTERIZATION OF DRUG RESISTANT *CLOSTRIDIUM PERFRINGENS* TYPE A FROM NECROTIC ENTERITIS

Arunava Das

Molecular Diagnostics and Bacterial Pathogenomics Research Laboratory, Department of Biotechnology, Bannari Amman Institute Technology, Sathyamangalam-638401, Erode District, Tamil Nadu, India,
E. mail: arunavadas@bitsathy.ac.in

Current research investigation focused to characterize 67 drug resistant *C. perfringens* type A isolated from 70 clinical cases of necrotic enteritis in chicken. The SEM analysis of infected intestines revealed immense necrosis and comprehensive destruction of intestinal villi inside intestinal mucosa. Isolates harbored multiple plasmids with 45.2Kb of common identical plasmids and were resistance to cefazaflur, cephalexin, doxycycline, metronidazole, tetracycline and amoxicillin. Isolates were genotyped by amplifying *cpa, cpb, cpb2, etx, cpe, iA,* toxin genes using PCR, revealed 100% positive for *cpa* and 46.2% with additional *cpb*2, confirming the association of multi drug resistant *perfringens* type A with necrotic enteritis.

Keywords: *Clostridium perfringens*, drug resistance, necrotic enteritis, PCR

OP-I.04: EFFECT OF BERGENIN ON ENDOCRINE SIGNAL MOLECULES AND ADIPOCYTE DIFFERENTIATION TRANSCRIPTION FACTORS IN HIGH FAT DIET -INDUCED DIABETIC C57BL/6 MICE

Ramalingam Saravanan and Sagadeven Ambika
Department of Biochemistry and Biotechnology, Annamalai University, Annamalai nagar, Government Arts College, Kumbakonam
Email: jayamsaranbio@gmail.com

We aim to investigate the role of Bergenin in diabetic C57BL/6J mice. Up regulated mRNA expression of sterol regulatory element-binding proteins (SREBPs), acetyl-CoA carboxylases (ACC) and peroxisome proliferator-activated receptor gamma (PPARã) were obsereved in HFD mice. Bergenin down regulated the mRNA expression of transcription factors in HFD mice than normal mice. Additionally, a decrease in the level of adiponectin and increase in the levels glucose, insulin and leptin in diabetic mice and also alteration of these biomacromolecules by Bergenin. This study shows that Bergenin facilitating adipogenesis and insulin sensitivity in type 2 diabetic mice through first messengers mediated signaling pathways.

Keywords: Bergenin, Obesity type 2 diabetes, Lipogenesis, Transcription factor and adipokine

OP-I.05: STAT3 MODULATES SCAVENGER RECEPTOR-A EXPRESSION DURING SILICOSIS VIA IL-10

Vani Mishra[1*], Rohit K. Mishra[2] and Avinash C. Pandey[1,3]
[1]Nanotechnology Application Centre, University of Allahabad, Prayagraj, UP-211002
[2]Centre of Science and Society, University of Allahabad, Prayagraj UP-211002
[3] Inter University Accelerator Centre (IUAC), Aruna Asaf Ali Marg, Near Vasant Kunj, New Delhi-110067
Email: vanimish@gmail.com

Pulmonary silicosis caused by amorphous silica nanoparticles (NPs) is an occupational disease affecting people worldwide every year. Stat3 and IL-10 has been found to be consistently upregulated during silicosis, however, its role in regulating Scavenger Receptor (SR)-A has not been elucidated. The current study delineates the role of Stat3 and IL-10 in regulating the expression of SR-A. siStat3 and exogenous IL-10 treatment reveal that Stat3 regulate SR-A expression which is subsequently regulated via IL-10. This was studied through ChIP assay that explained Stat3 binding over IL-10 promoter region. The work shall help in developing therapeutic intervention for silicosis.

Keywords: Scavenger Receptor, Silicosis, Stat3, IL-10

OP-I.06: INSIGHT FROM STRUCTURAL INTERACTIONS OF CURCUMIN BIOTRANSFORMED COMPOUNDS WITH CAGA ONCOPROTEIN OF *HELICOBACTER PYLORI*

Akhileshwar Kumar Srivastava
PCBT Department, CSIR-CFTRI, Mysore, India
Email: akhileshwar.kumar2@gmail.com

The current study assessed the interactive potential of curcumin biotransformed and conventional drugs with CagA oncoprotein. The molecular docking was conducted using PatchDock and Firedock online server. The results obtained from FireDock, the binding energy (-36.37 kcal/mol) of curcumin was higher than amoxicillin (-34.78 kcal/mol), pantoprazole (-34.08 kcal/mol), and metronidazole (-25.12 kcal/mol), except for clarithromycin (-51.06 kcal/mol) whereas metabolized CUR-GLR (54.55 kcal/mol) had highest binding affinity with CagA. The current study suggested that the curcumin and its biotransformed compounds similar to conventional drugs could act as anticancer agents against CagA+ *Helicobacter pylori* infection.

Keywords: CagA, Curcumin, Conventional Drugs, Molecular docking

OP-I.07: THE MULTIPLE ANTIBIOTIC RESISTANCE (*MAR*) OPERON OF ENTERIC BACTERIA CONTROLS DNA REPAIR AND OUTER MEMBRANE INTEGRITY

Prateek Sharma[1] and David C Grainger[1]

[1]*Institute of Microbiology and Infection, School of Biosciences, University of Birmingham, Birmingham, B15 2TT, West Midlands, UK*

E mail: prateek.geneticengineer@gmail.com

Antibiotic resistance in bacteria is a serious problem worldwide. Multiple antibiotic resistance in bacteria can be driven by the transcriptional regulators in the AraC-XylS family. The *Escherichia coli* '*mar*' regulon is considered a paradigm for such systems. The *mar* locus consists of 3 genes; *marR*, *marA*, and *marB*. A transcriptional activator encoded by *marA* enhances drug resistance by binding to "marbox" sequences at target promoters. The best characterised MarA targets encode the AcrAB-TolC drug efflux pump. We identified 33 new MarA targets by ChIP-Seq analysis in a pathogen Enterotoxigenic *E.coli* (ETEC). Analysis of MarA targets has revealed novel mechanisms of resistance to tetracyclines and quinolones. Briefly, MarA upregulates genes that are involved in lipid trafficking and DNA repair, thus reducing antibiotic entry and quinolone-induced DNA damage.

OP-I.08: PHYTOCHEMICALS FROM *RUTA GRAVEOLENS* LEAF RETARD CANCER CELLS GROWTH THROUGH PROLIFERATION INHIBITION IN VITRO

Ravi Kumar H, Puttraju H. P & Divya R
Department of Life Science, JB Camus, Bangalore University, Bangalore-560056
Email: drravikumarh@bub.ernet.in

Ruta graveolens (RG) is a medicinal herb with known anti-inflammatory properties. RG has been used in the management of diseases such as allergy, asthma, autoimmune diseases. Preliminary studies using the extracts of RG leaves have reported potent anti-oxidant and anti-inflammatory activities. But, not much is known about the anti-cancer properties of the extracts of RG leaves and roots. Hence in this study we have prepared extracts of RG leaves using solvents of increasing polarity, and tested the efficacy of prepared extracts for inhibiting ROS (which are required for the transformation of normal cells to cancer cells) and the proliferation of cancer cells. Analysis of the data showed a dose dependent increase in the antioxidant activity as well as anti-cancer activity, especially with the chloroform and ethanol extracts. For instance, a significant 80% cell death was noticed when MDA-MB-468 cells were exposed to chloroform extract. Studies are currently evaluating the efficacy of these extracts for modulating the expression of key signalling cascades involved in tumour cell proliferation and apoptosis.

Keywords: *Ruta graveolens,* breast cancer cell line, phytochemical.

OP-I.09: DETERMINATION OF CYTOTOXIC ACTIVITY OF *EMBELIA ROBUSTA* AGAINST HUMAN CERVICAL (HELA) CELLS LINE USING MTT ASSAY

A.Roja Rani and Sharada Seekonda
Department of Genetics, Osmania University, Hyderabad, Telangana
Email: anupallirr@gmail.com

The MTT assay measures the metabolism of 3-(4,5-dimethylthiazol-2-yl)-2-5-biphenyltetrazolium bromide to form an insoluble formazan precipitated by mitochondrial dehydrogenase, present only in viable cells. Cells are treated with serial concentrations of extract of *E. robusta* were absorbance was measured at 570 nm. All the concentration of test solution exhibited varying percentage of cell inhibition (6.223 % - 97.832%). Among all, IC 50 value was found to be at 170 µg/ml. of plant extract.

OP-I.10: BANANA LECTINS AS TOOLS FOR CANCER DIAGNOSIS

Sanasam Yaiphabi, Oinam Sangita Devi, K Rana, Senjam Sunil Singh*
Department of Biochemistry, Manipur University
**Correspondence Email: sunil_senjam@rediffmail.com*

Lectins are generally carbohydrate-binding proteins found in a variety of organisms, including animals, plants, fungi, bacteria and viruses. Traditionally banana has been used for numerous medicinal purposes. Banana is the common name for both herbaceous plants of the genus *Musa* and for the fruit they produce. Banana lectins have the potential for inhibiting HIV-1 reverse transcriptase activity, suppressing cancer cell proliferation and stimulating macrophage activities. Compared to other plant lectins, very few banana lectins have been structurally characterized or produced in a recombinant form particularly with respect to their structure and biological functions. Herein we focus our points on the structure, functions and exploitable properties of banana lectins.

Keywords: Musa, banana lectins, reverse transcriptase, cancer cell proliferation, macrophage

OP-I.11: APOPTOSIS INDUCING FACTOR (AIF) CAN PLAY AN IMPORTANT ROLE IN CELL DEATH OF *ENTAMOEBA HISTOLYTICA*

Anwesha Bandyopadhyay[1], Sudip Kumar Ghosh[1*]
[1]Department of Biotechnology, Indian Institute of Technology Kharagpur, Kharagpur 721302, India
E mail: oli.anwesha@gmail.com

Putative **A**poptosis **i**nducing-**f**actor (AIF) in *Entamoeba histolytica* was identified bioinformatically. The biology of cell death execution in *Entamoeba histolytica* in a caspase-free environment was tried to be found out by functional characterization of this putative EhAIF. Down-regulation of the gene by dsRNA mediated RNAi technology revealed that cell viability increases several folds on receiving death insult when pre-treated with gene specific dsRNA with respect to non-treated control population.

Simultaneously, an **A**TG8 **I**nteracting **M**otif (AIM) at the C-terminal end of the protein EhAIF was predicted by bioinformatical analysis and pull-down assay showed that these two proteins can interact *ex vivo*.

Keywords: Apoptosis-inducing factor, AIM, RNAi

OP-I.12: DFT ANALYSIS OF RADICAL QUENCHING ACTIVITY OF DIHYDROCANARIC ACID AND ITS ROLE IN THE TREATMENT OF CANCER

Anindita Ghosh, and Chinmay Kumar Panda*
Department of Oncogene Regulation, Chittaranjan National Cancer Institute, Kolkata-700026, W. Bengal, India
Email:anins30@rediffmail.com

Dihydrocanaric acid(3,4-*seco*-lup-20(29)-en-3-oic acid), an essential rare triterpene, isolated from *Holarrhena antidysenterica* was studied in the management of radical scavenging which in turn helps in cancer treatment. Theoretically, it has been determined by DFT calculations using M06-2X hybrid functional and the double-ζ- split-valence 6-31G (d, p) basis set that the molecule can scavenge nitric oxide by the addition of NO radical at double bond position. Further, Molecular docking studies of DCA performed with the different cancer receptors showed better binding affinities than Doxorubicin. This study suggests that the DCA could be an effective option in fighting cancer with minimal side effects.

Keywords: DFT, nitric oxide, radical scavenging, molecular docking

OP-I.13: ROLE OF PHYTOCHEMICALS IN SPICES IN HEALTHCARE

Prof. (Mrs.)B Andallu
Department of Food and Nutritional Sciences
Sri Sathya Sai Institute of Higher Learning, Anantapur campus, Anantapur, Andhra Pradesh
E mail: bandallu@sssihl.edu.in

Almost, 70% of modern drugs in India have been developed from plants used in the traditional system of medicine. Many experimental and clinical evidences support the casual relationship between oxidative stress and various chronic diseases and hence, numerous studies are focused on ameliorating chronic diseases by decreasing oxidative stress. Epidemiological and clinical studies suggest that phytochemicals can combat oxidative stress and reduce the morbidity and mortality associated with chronic diseases. Phytochemicals mainly from spices such as aniseeds, ajwain, coriander etc. include isoprenoids, polyphenols, flavonoids, terpenoids, carotenoids, phytoestrogens, alkaloids which exhibit antioxidant (ascorbic acid, beta-carotene, á-tocopherol, lycopene, luteolin, thymol etc.), anti-inflammatory (quercetin, curcumin,thymol etc.), osteogenetic (genistein, diadzein, casein, inulin, etc.), hypolipidemic (MUFA, PUFA, resveratrol, saponins, tannins, beta-sitosterol, etc.) and anticarcinogenic (capsaicin, genistein, curcumin, ellagic acid, lutein, etc.) properties. These phytochemicals fight against reactive oxygen species (ROS) or reactive nitrogen species (RNS) and ameliorate oxidative stress-related diseases, such as neurodegenerative, cardiovascular, inflammatory diseases, and cancer. These compounds are powerful instruments in promoting optimal health, longevity and quality of life and hence, 'bioactive phytochemicals' in spices can be considered as lead molecules for healthcare.

Keywords: Phytochemicals, spices, oxidative stress, antioxidants, anti-inflammatory, hypolipidemic anticarcinogenic

OP-I.14: SWERTIAMARIN A POTENT ANTIDIABETIC COMPOUND ENHANCES GLUCOSE UPTAKE IN INSULIN RESISTANT HEPG2 CELL LINES

Dhanavathy G, Kanagaraj P
Department of Biotechnology, School of Bioengineering, SRM Institute of Science and Technology, Kattankulathur, Kanchepuram, India-603203
E-mail: dhanavathy.2006@gmail.com

Diabetes mellitus (DM) is a metabolic disorder widely spread worldwide and in India. Alternative to synthetic drugs is an herbal medicine which has emerged as a unique approach to meet a safe, effective and novel drug for the treatment of T2DM. Swertiamarin, an active lead compound isolated from the ayurvedic medicinal plant *Enicostemma littorale*.Blume possess antidiabetic activity and enhances â-cell regeneration which causes reversal of diabetes. Insulin resistant HepG2 (IR/HepG2) model, clearly shows the glucose uptake efficacy of swertiamarin by using 2-NBDG, flowcytometry analysis. Mechanism of action of the antidiabetic drug swertiamarin has been studied in order to understand the exact mechanism of insulin signaling pathway involving the insulin sensitization via glucose uptake through translocation and activation of GLUT4 in PI3K/p-Akt signaling pathway by swertiamarin.

Key words: 2-NBDG, Flowcytometry, Swertiamarin, â cell regeneration, Insulin resistant HepG2

OP-I.15: DNA APTAMER USED AS A SENSOR IN EARLY BREAST CANCER DIAGNOSIS

Kanagaraj P, Dhanavathy G
Department of Biotechnology, School of Bioengineering, SRM Institute of Science and Technology, Kattankulathur, India – 603203
**Email: muthammal.kanagaraj@gmail.com*

Breast cancer is leading cause of cancer related deaths in young women in India. In order to diagnosis early breast cancer, we recently developed DNA aptamers against ABCG2 expressing BCS cells. The selected aptamers were cloned in bacterial system and sequenced. The potential aptamers were tested against breast cancer cells and human breast cancer tissues. The aptamer binding were confirmed by flowcytometry and confocal microscopic techniques. Interestingly, ABCG2-specific aptamers labeled the membrane surface of the ABCG2-expressing baby hamster kidney (BHK) cells, but stained whole cells of the BCS cells derived from mammospheres. In addition, 5D3, a monoclonal antibody that recognizes the extracellular loops of ABCG2 protein, also stained whole BCS cells and also ABCG2 expressing cells. Our studies demonstrated that DNA aptamers specifically recognizes BCS cells. We will plan to design aptamer-conjugated nanochips to diagnose early detection of circulating BCS cells. In this study may provide early detection in patient with breast cancer in the clinical conditions.

Key words: Aptamers, breast cancer, stem cells, nanochip

OP-I.16: MODE OF ACTION OF BACTERIOCIN FROM FOOD-ISOLATE *ENTEROCOCCUS HIRAE* LD3 AGAINST TARGET BACTERIA

Santosh Kumar Tiwari
Department of Genetics, Maharshi Dayanand University, Rohtak-124001, Haryana, India
Email: santoshgenetics@gmail.com

Minimum inhibitory concentration (MIC) of enterocin LD3 against *Micrococcus luteus* MTCC106 and *Escherichia coli* NCDC135 was 80 and 112 μg ml^{-1}. The efflux of potassium ion (K^+) was 14 and 13 ppm in cell-free supernatant of MIC-treated cells of *M. luteus* and *E. coli*, respectively. The higher infrared absorbance at 1451.82 cm^{-1} and ~1,094.30 cm^{-1} suggested its interaction with cell membrane and nucleic acids of target bacteria. Transmission electron microscopy of the bacteriocin-treated cells revealed disruption of cell membrane. The study discloses the possible mechanism of action of enterocin LD3 against Gram-negative bacteria which is a rare phenomenon.

Keywords: enterocin LD3, bactericidal, intracellular ions, infrared spectroscopy, transmission electron microscopy

OP-I.17: ANTI-INFLAMMATORY EFFECT OF *B. BREVE* NCIM 5671 IN ADJUVANT INDUCED ARTHRITIC RATS

Prakash M Halami[a,b]*, Sajan C Achi[a,b]

[a] *Academy of Scientific and Innovative Research (AcSIR), Gaziabad, Uttar Pradesh, India*

[b] *Department of Microbiology and Fermentation Technology, CSIR- Central Food Technological Research Institute, Mysuru 570020 India.*

** Corresponding author prakashalami@cftri.res.in*

The human gut is known to harbour trillions of microbes which are highly diverse and have at least 1000 different species of known bacteria with more than 3 million genes (150 times more than human genes). The composition of this microbial community is host specific, evolving throughout an individual's lifetime and susceptible to both exogenous and endogenous modifications. These microbes have a significant role in degradation of non-digestible components of the diet, production of new nutrients, bioavailability of nutrients, removal of toxic compounds, and protection against diseases. Gut microbes are also believed to have a bidirectional interaction with the host and such dynamic interactions are responsible for the maintenance of homeostasis and prevention of diseases. Any disturbances which affect the composition of these microbial community leads to disruption of homeostasis and consequently a diseased state.

Bifidobacteria is one such gut commensal species well known for its positive contribution towards host health. They are the early gut colonizers, known to colonise the gut of the neonates during their delivery or during breastfeeding. These microbes enter into symbiotic relationships with the host and play a role in the development of immune system, maturation of immune cells, and self-tolerance. However unhealthy lifestyle, ageing etc leads to decrease in count of these microbes. Lower counts of these bacteria have been associated with various diseases. Hence, supplementation of bifidobacteria is believed to restore normalcy; as a result, bifidobacterial probiotics have become widely popular among the consumers.

Several studies have established the protective role of *Bifidobacterium* in different diseases; however, there is a lack of information on its role in inflammatory disease like arthritis. In the present study the immunomodulatory effect of native *Bifidobacterium* isolates in adjuvant induced arthritic rats have been studied. Rats were fed with Probiotic bifidobacteria followed by induction of disease. Various markers associated with the disease such as paw swelling, inflammatory and anti-inflammatory cytokine levels in serum, oxidative stress markers, and degradation of joints were monitored and compared with standard drug (piroxicam) treated animals to determine the prophylactic effect of the probiotic bacteria. Rats fed with *B. breve* had demonstrated reduced severity of paw swelling, bone loss, oxidative stress, RA markers and eicosanoids compared to arthritic control rats. An increase in anti-inflammatory cytokines and decline in pro-inflammatory cytokines was also observed. The reduction of symptoms associated with adjuvant induced arthritis in rats treated with *B. breve* NCIM5671 indicates the immunomodulatory role of *Bifidobacterium.*

OP-I.18: POTENTIAL ROLE OF PROBIOTIC BACTERIA *LACTOBACILLUS FERMENTUM* STRAIN CM3 ON PREVENTION AND TREATMENT OF COLORECTAL CANCER

Nannu Shafakatullah* and Madaiah Chandra
Department of Bio-Sciences, Mangalore University, Mangalagangothri-574199, Karnataka
Email: shafakhath@yahoo.com

Beneficial bacteria present in the environment can protect human from harmful threats when identified and used them accurately. In the present study the probiotic bacterial strain was isolated from fresh cow's milk and identiûed through 16S rRNA sequencing. Results of 16S rRNA sequencing revealed that the isolate belongs to the *Lactobacillus fermentum* species. The strain exhibited good probiotic properties. The anti-colorectal cancer properties of the strain on N, N'-Dimethylhydrazine dihydrochloride (DMH) induced mice was investigated. Treatment of colorectal cancer induced mice with the isolate resulted in significant reduction in the proliferation of cancerous growth. The antioxidant study results showed that there is significant increase (P Â0.001) in GST activity, SOD level (P<0.001) and GSH concentration (P<0.001) in the treatment groups. Bacterial enzyme study results revealed that the faecal â-glucosidase and â-glucuronidase activity significantly (P<0.001) reduced compared to positive control groups. Significant (P<0.001) reduction in the harmful coliforms in the intestinal tract and significant (P<0.001) increase in the *Lactobacillus* count was observed. Probiotics confer anti carcinogenic effect by excluding pathogenic microorganisms by competing for nutrients and receptors, producing antimicrobial metabolites and intern activating host immune system. These results suggest that *Lactobacillus fermentum* strain CM3 could be used as a potential probiotic strain to control colorectal cancer chances. However the successful translation of these pre clinical strategies into clinical practice will depend on the outcome of clinical trials. Therefore, this strain should be subjected to the other required tests to prove its suitability for clinical therapeutic application.

Key words: Colorectal cancer, GSH, GST, *Lactobacillus fermentum* strain CM3, Probiotics, SOD

OP-I.19: DETECTION OF APICAL MEMBRANE ANTIGEN – LIKE PROTEIN IN *LEISHMANIA DONOVANI,* A FACILITATOR IN SUCCESSFUL PARASITISM

Bhakti Laha*#, Amit Kumar Verma[1]
**Department of Physiology, T D B College, Raniganj–713347*
[1]Department of Biotechnology, T D College, Ballia
 # Corresponding Author's E mail– bhaktilaha@gmail.com

The protozoan parasite, *Leishmania donovani* occurs in two life forms: free living promastigotes and intracellular amastigotes. The current study identifies a secretory protein, Apical Membrane Antigen in the promastigote form following a *Leishmania* specific complementary DNA sequence of a gene.

The cloned gene has been exploited for its encoded peptide to raise antisera whereby antisera A and B identify two forms of this native protein (95kD and 66kD), respectively. Both of these forms are expressed in promastigotes being present in amastigotes as well; as supported through the RT-PCR, fluorescence and electron microscopic studies. Localization of the 95kD form in the flagellar pocket and the 66kD form at flagella and external surfaces denote it to be secretary type. The protein level expression is also confirmed in *L. donovani* vs *L. major.*

These different forms are sequenced after purification revealing several domains, viz., Methyltransferase, BipB and serum albumin, which may help in active parasitism. The *in silico* 3D models with their probable ligands and *in vitro* studies with fluorescent cholesterol indicate their close association with both parasitic and host cell membrane.

Thus it can be hypothesized that being unable to synthesize cholesterol molecule, these parasites import several fatty acids and synthesize steroid precursors for its successful parasitism using this AMA1 – like protein to adapt in the diverse mammal system.

OP-I.20: AIRBORNE FUNGAL SPORES IN INDUSTRIAL AREA, BANGALORE

Pavan R.
Central Research Laboratory, Sapthagiri Institute of Medical Sciences and Research Center, Hesaraghatta Main Road, Bangalore – 560 090, Karnataka
Email: drpavanr@gmail.com

In recent years, Bangalore is considered to be one of the fastest growing cities in the world. The concentration and biodiversity of airborne fungi of the Yeshwanthpur Industrial Area, Bangalore was studied for a period of one year by using Anderson two-stage viable sampler to assess the concentrations of fungal spores. Total 26 fungal types were isolated, representing mainly 4 major genus *Fusarium, Pencillium, Aspergillus* and *Cladosporium*. Majority of the fungi isolated are known allergens; they could also be opportunistic causing various diseases in man. An attempt has been made to forecast atmospheric fungal spore concentration for Bangalore city.

Keywords: Airborne Fungi, Allergy, Biodiversity, Anderson Sampler, Concentration

Symposium-II: Agricultural Biotechnology: Science for Lab to land.

OP-II.01: EFFECT OF MALATHION ON CYTOPHYSIOLOGICAL ACTIVITY, DNA DAMAGE AND ANTIOXIDANT ENZYMES IN ROOT OF *ALLIUM CEPA*

Divya Singh
Department of Mulberry physiology, CSRTI-Mysore, India,
Email: divya.ds012@gmail.com

Our study emphasized on treatment of root of *Allium cepa* L with malathion at different concentrations (0.05, 0.13, 0.26, 0.39 and 0.52 g/L). The obtained results had adverse effect on cell division and root elongation at 0.13 to 0.52 g/L. The proline accumulation decreased the sugar content. The lipid peroxidation level associated with antioxidant enzymes was increased with up-regulation of ascorbate peroxidase and glutathione reductase were down-regulated and down-regulation of catalase , glutathione-S-transferase and superoxide dismutase. DNA damage was observed by single cell gel technique. Above results suggest the malathion application induces cytotoxic and phytotoxic effects.

Keywords: *Allium cepa*, antioxidant enzymes, DNA damage, malathion, molecular docking

OP-II.02: CROSS TALK BETWEEN HEME OXYGENASE1 (HO1) AND AUXIN RESPONSE FACTOR (ARF) GENES FOR SALT TOLERANCE AND LATERAL ROOT DEVELOPMENT IN *CICER ARIETINUM* L

Khushbu Verma[1] & Shubham Dixit[2]

[1]*Jayoti Vidyapeeth Women's University, Jaipur, Rajasthan*

[2]*Institute of Bioinformatics and Applied Biotechnology, Bengaluru, Karnataka*

Email: vermakhushbu25@gmail.com

hemeoxygenase (HO1) plays positive role in Salt tolerance, but its regulatory role in Lateral root development is still unknown. In present exploration, regulatory connection between HO1 and ARF genes was identified through the expression level analysis of both HO1 & ARF coding genes. It was established that lateral root growth along with elevated ARF5, ARF6 and ARF 7 gene expression profiles were regulated by HO-1 in NaCl+10uM Hemin treated *Cicer arietinum* L. The current study proposes that the synergistic mode of HO1 expression and ARF genes dependent Auxin regulation have key responsibility for plant salt tolerance and LR development.

Key words: hemeoxygenase (HO1), ARF genes, Salt tolerance, Hemin, *Cicer arietinum* L.

OP-II.03: *IN SILICO* SCREENING OF CERTAIN BIOACTIVE COMPOUNDS FROM *CEASALPANIA BONDUC* (FEVER NUT) FOR SELECT CLASS I AND II TYPE HUMAN OLFACTORY RECEPTORS (ORS) AGAINST ASTHMA AND COPD

B. Nagarathnam[1], A. Gandhimathi[2], J. Philip Robinson[3], P. Ponmurugan[4], V. Balakrishnan[5], R. Sowdhamini[6]

[1,2,6]National Center for Biological Sciences (TIFR), Bangalore, India
[3]Department of Biotechnology, K.S.Rangasamy College of Technology,Tiruchengode, Namakkal Dt,Tamil Nadu, India
[4]Department of Botany, Bharathiar University,Coimbatore ,Tamil Nadu,India.
[5]PG and Research Department of Botany, Arignar Anna Govt. Arts College, Namakkal, Tamil Nadu,India
E mail: bnagarathnam@ncbs.res.in

Olfactory receptors (OR) belong to trans membrane proteins (GPCRs) and are effective drug targets. The occurrence of class I (sense water-borne odors) and II (sense air-borne odors) type human ORs not only depict odor diversity but also illustrate receptor specificity. Insilico screening showed significant docking scores for the compounds from *Ceasalpania bonduc* (Kantkarej in Hindi, Kuberakshi in Sanskrit) as close to the commercial drug theophylline and other familiar natural compounds. These findings suggest the pharmacological features, novel compounds of the herb to treat asthma, COPD and further can be used in aromatherapy, INDD - a painless drug delivery system.

OP-II.04: ISOLATION, CHARACTERIZATION AND APPLICATION OF FUNGAL LACCASES IN THE DEGRADATION OF PESTICIDES

Preethi Rajesh
Garden City University, Bangalore-49
Email: Preethi.rajesh@gardencity.university

Laccase is one of the few enzymes that has extensive application and not been explored widely. The enzyme is a type of copper-containing polyphenol oxidase found in the exudates of plants and certain microorganism. The present study aims at mycoremediation of pesticides using laccases. The laccases isolated from two sources – elephant Yam and Clove were characterized by measuring its specific activity. The partially purified enzyme was further utilized for evaluation of its degradative efficacy on phenolic compounds particularly pesticide dicofol. The Gas Chromatography – Mass Spectroscopy analysis (GCMS) of the enzyme treated pesticide sample confirmed the degradation of the dicofol by fungal laccases.

Key Words – Myco remediation, GCMS, Polyphenol oxidase

OP-II.05: IDENTIFICATION AND CHARACTERIZATION OF THE ANTIMICROBIAL AND ACTIVE COMPONENTS OF TEA (*CAMELLIA SINENSIS*)

Hridi Halder, Reetish Raj Sahoo, Shuvrangshu Guha, Sagnik Bhattacharjee, Dyutika Banerjee, Sudeshna Shyam Choudhury*
Microbiology Department, St. Xavier's College, Kolkata
Email: sscxaviers@gmail.com

Four main types of processed tea samples are collected from Badamtam tea garden of Darjeeling under Goodricke: White tea, Green tea, Oolong tea and Black tea. After collection of these tea samples, various assays were performed like the - Antioxidants potential assay, Total flavonoids assay, Antimicrobial assay, Rutin and Quercetin content, identification of active metabolites in different solvents - Aqueous, DMSO, Acetone, and Ethanol. To identify and characterize them for a phytochemical drug designing, it is necessary to find out in which solvent the active component is best extracted out to manifest antimicrobial and antioxidant potential. Aim of this paper is to find out the comparison of antimicrobial and antioxidant capacities of 4 different types of tea according to manufacture difference and to differentiate between fresh leaves and manufactured of the same garden. Our aim is also to screen the causative active metabolites which are responsible to show such activities and to check the presence or absence of the active components on different solvents as well.

Keywords: - Antimicrobial, Antioxidant, Rutin, Quercetin, Flavonoid, Polyphenol

107TH INDIAN SCIENCE CONGRESS

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V

ABSTRACTS OF POSTER PRESENTATIONS

Symposium-I: Health care Technology: Bench to bedside and beyond.

P-I.01: ISOLATION OF ENTOMOPATHOGENIC NEMATODES: BIOASSAY AGAINST MOSQUITO LARVAE VECTORS

Dilipkumar Aiswarya*, Pachiappan Perumal
Department of Biotechnology, Periyar University, Salem-636011, Tamil Nadu, India
**Corresponding author: aisubit@gmail.com*

Entomopathogenic nematodes (EPNs) of the genera; *Steinernema* and *Heterorhabditis* are used commercially for biocontrol against insect pests. The present study was to identify the potential of mosquito larvae against EPNs. NGP-6 and APTM strains were identified as *Steinernema siamkayai*. Three different mosquito larvae viz; *Ae. aegypti*, *An stephensi* and *Cx. quinquefasciatus* were used for pathogenicity assay. *S. abbasi* showed maximum larvicidal effect on *Ae. aegypti* (LC_{50} & LC_{90} values: 13.61 & 42.29 IJs/larvae). *S. siamkayai* (NGP-6) showed maximum activity on *An. Stephensi* and *Cx. quinquefasciatus* (LC_{50} & LC_{90} values: 41.47 & 74.68 and 13.25 & 43.85 IJs/larvae) at 72 h.

Keywords: Entomopathogenic nematodes, *Aedes aegypti Anopheles stephensi* and *Culex quinquefasciatus*

P-I.02: EFFECT OF TEMPERATURE AND PH ON BETA-GLUCOSIDASE ACTIVITY AND PROTEIN PRODUCTION FOR *TRICHODERMA REESEI*

Anjali Sharma* and A. K. Jaitly
Microbiology Lab, Department of plant science, M.J.P.R.U, Bareilly, 243006, U.P
Email: sharmaanjali3012@gmail.com

Cellulose hydrolysis into their monomers is catalysed by three different enzymes, which includes endoglucanase, exoglucanase and beta-glucosidase, of which beta-glucosidase has significant role in industries. *Trichoderma reesei* is one of the best known fungus to hydrolyze cellulose and are ubiquitous in nature. Due to absence of sexual reproduction *Trichoderma reesei* are classified as imperfecti fungi with strong cellulose-degrading properties. Temperature, pH and salinity were optimized in broth culture using rice bran and wheat husk as substrate. Result showed that optimum cellulase activity and protein production was in temperature range of 25-30° while optimum pH range was of 4.0-5.5 but enzyme activity has also been observed in low pH range i.e. 3.0 to very high pH range i.e. 7.0. After the optimization in broth culture it showed that optimize environmental conditions were found to increase enzyme activity by three fold.

Keywords: endo-glucanases, cellobiohydrolases, beta-glucosidase, imperfecti fungi etc.

P-I.03: VALIDATION OF MUTATION USING AUTOMATED SANGER SEQUENCING IN EPILEPTIC PATIENTS

Ankush Bala[1], Sanjiban Chakrabarty[2] and Parvinder Kumar[1]
[1]Department of Zoology, University of Jammu, 180006
[2]School of Life Sciences, Manipal University, 576104
Email: ankushbala93@gmail.com

Epilepsy is a chronic neurological disorder that is characterized by unpredictable interruption of normal functioning of brain and the person suffers from recurrent epileptic seizures. ã -aminobutyric acid type A receptor sub-unit â3 (GABRB3) is an important neurodevelopmental gene that encodes â3 subunit of GABAA receptor that play an important role in neuronal growth and differentiation. Mutational analysis of GABRB3 gene was already done by Next Generation sequencing at the Microarray Lab in Manipal and three mutations were found. We have focused our study on further validation of these mutations by Automated Sanger Sequencing method and it was found that- In case 1, the mutation that was seen in NGS was not observed when validated by Sanger Sequencing. In case 2, the mutation seen in NGS was also present in Sanger Sequencing but was located in intronic region so cannot be considered to have functional effect. In case 3, the mutation was seen in the conserved region. Although it is a low copy mutation but it can be considered to have a functional role in causing the disease progression.

Keywords: Automated Sanger Sequencing, Epilepsy, GABRB3 gene, Mutations, Next Generation Sequencing (NGS)

P-I.04: ISOLATION AND CHARACTERIZATION OF KERATINASE FROM FEATHER DEGRADING SOIL BACTERIA

Ashish S. Wani* & Govinda R. Jadhav
Department of Biotechnology, New Arts, Commerce and Science College, Ahmednagar, Maharashtra
**E-mail- ashishwani19@gmail.com*

Proteolytic bacteria were isolated from local poultry waste of Ahmednagar region. Two isolates out of four showed high keratin degrading activity when cultured in broth containing feathers. These two isolates (P1 and P4) were identified and found to be belonging to *Azotobacter* and *Bacillus* genus respectively. Keratinase was produced using both isolates and characterized. Maximum keratinase activity of isolate P1 was 38.1 U/ml and P4 was 51.7 U/ml. Optimum pH for enzyme activity was found to be 9. Also optimum temperature for P1 keratinase was 40^{O}C and for P4 Keratinase it was 50^{O}C. The keratinase activity was inhibited by metal ions such as $MnCl_2$, $BaCl_2$ and $CaCl_2$. Keratinase has application in improving digestibility of feather.

Keywords: Keratinase, Proteolysis, Poultry waste, Feathers, Bacteria

P-I.05: EFFECT OF TAXOL IS MEDIATED VIA SPECIALIZED LIPID RAFT STRUCTURE "CAVEOLAE" ON HELA CELLS

B Anil Kumar* and Neesar Ahmed
School of Life Science, B. S. Abdur Rahman Crescent Institute of Sciences and Technology, Vandalur, Chennai -48
**Email: bommanaboina_2015@crescent.education*

Caveolae is a cave like structure present on the cell surface of many cells including cancer cells. It is observed that caveolae plays an important role in the drug uptake. There was an increased in the Caveolin-1 (marker of Caveolae) clustered upon drug (taxol) treatment on GFP-Cav-1 transfected HeLa cells. We demonstrate that rhodamine- taxol conjugate predominantly localization on the cell surface of HeLa cell lines moderate levels of Caveolin 1 -GFP localization indicating the interaction between the drug conjugate and Caveolin 1. Interestingly, after the treatment with increase in time Caveolae formation followed by internalization was observed. Further, these interactions were strongly supported by localization studies by TIRF microscope. Localization of rhodamine- taxol conjugate and Caveolin- 1- GFP signals were observed as early as 5 minutes and reached saturation by 9 h. In support to this, HeLa cells were treated with beta cyclodextrin followed by taxol treatment. There was not much effect of taxol on the cell viability as compared to taxol treatment alone. However, when HeLa cells were treated with beta cyclodextrin, cholesterol and taxol decreasing viability was observed. These observations thus, infer that there was interaction between taxol and caveolin-1.

Keywords: Taxol, 10 DAB III, Caveolin 1, Caveolae and Rhodamine- taxol conjugate, Beta cyclodextrin, Cholestrol

P-I.06: EUGENOL: A POTENTIAL THERAPEUTIC POLYPHENOL, PREVENTS ARSENIC TRIOXIDE-INDUCED MYOCARDIAL INSULT IN RAT CARDIAC MYOCYTES

Binu P [a] and R Harikumaran Nair [a]

[a]Physiology Research Laboratory, School of Biosciences, Mahatma Gandhi University, Kottayam, Kerala, India- 686 560

Email:harinair@mgu.ac.in; binu77gprakash@gmail.com

The present study attempts to elucidate the protective role of eugenol against arsenic trioxide (As_2O_3) induced toxicity in H9c2 rat cardiomyoblast cell line mode. H9c2 cardiac cells were exposed to 10 μM As_2O_3 for 48 h to induce cytotoxicity. It caused collapse of mitochondrial membrane potential and membrane ATPase activities. Moreover, co-treatment with eugenol ***(6*** μM) inhibited apoptosis and maintain proper MMP. Cells allied with eugenol maintained the membrane ATPase ativities. Eugenol protects H9c2 cells from ROS linked oxidative stress and modulates mitochondrial membrane permeability. This data clearly demonstrates that eugenol is strongly cardioprotective against cardiac insult by As_2O_3.

Keywords: Apoptosis, Arsenic trioxide, Eugenol, cardiomyocytes

P-I.07: VAV, AN ONCOGENE, NEGATIVELY REGULATES PRODUCTION AND MOBILIZATION OF ENDOTHELIAL PROGENITOR CELLS

Biswarup Basu,[1,2*]

1. Mouse cancer Genetics Program, National Cancer Institute, 1050 Boyles Street, Frederick-21702, Maryland, USA

2. Department of Neuroendocrinology, Chittaranjan National Cancer Institute, Kolkata

**Corresponding Author's E-mail: biswarup.basu@gmail.com*

Vasculogenesis is an important process in normal physiological conditions like wound healing or in pathological settings like cancer. Impaired vasculogenesis is characterized by severely impaired endothelial functions in terms of decreased mobilization of endothelial Progenitor Cell (EPC) from bone marrow niche to circulation and their production in bone marrow. Vav is an oncogene of hematopoietic lineages and has guanidine nucleotide exchange function and particularly have role in endothelial function. Present study, for the first time explores Vav's role in EPC mobilization and production in a knockout (KO) mice model. Vav knockout mice showed increased MMP9 expression in bone marrow stromal cells leading to elevated soluble kit ligand (scf) mediated release of ckit+ EPC in circulation. Results indicated that Vav has a negative regulatory effect in vasculogenesis and this finding can be useful in modulating EPC function in cancer.

Keywords: Vav, Endothelial Progenitor cell, Knockout mice, Endothelium

P-I.08: COMPARISON OF *IN VITRO* CULTURE OF *OSBECKIA ASPERA* AND *O. RETICULATA*

Bosco Lawarence* and Murugan K
Department of Biotechnology & Botany, Govt. Arts College,
Trivandrum, 695 014, Kerala
Email: boscotvm@gmail.com

The aim of this study was to develop micropropagation procedures for the heavily exploited and threatened *Osbeckia* species *Osbeckia aspera* and *O. reticulata* to facilitate conservation and reforestation. Both species are difficult to establish and grow in tissue culture because of their high phenolic content. A protocol for the establishment of explants *in vitro* was developed comprising decontamination, media and hormonal treatment. *Osbeckia aspera* and *O. reticulata* have been used in Indian ayurvedic medicine for the treatment of a wide number of health disorders. The present study deals with the influence of different plant growth regulators (PGR) including kinetin (Kin), 6- Benzyl aminopurine (BAP) and 2, 4-Dichlorophenoxyacetic acid (2,4-D) on the growth of plant. Nodal and leaf segments used as explants were cultured on Murashige and Skoog's medium (MS) supplied with different concentrations of PGRs. Multiple shoot generation was achieved after substantial days of incubation. The result concluded that various concentration of PGR had a significant role in *in vitro* regeneration of plant.

Keywords: Micropropagation, Nodal Explant, MS Medium, Kinetin, Medicinal, Benzyl aminopurine, *Osbeckia aspera* and *O. reticulata*

P-I.09: FIBRINOGENOLYTIC AND PRO-COAGULANT ACTIVITIES OF *MANILKARA ZAPOTA* LATEX

C.G.Kusuma, Vinod Gubbiveeranna, C. K. Sumachirayu, S. Bhavana, S. Nagaraju*
Department of Studies and Research in Biochemistry, Tumkur University, Tumkur–572103
Email: nagarajubiochem@gmail.com; nagaraju@tumkuruniversity.ac.in

Manilkara Zapota also known as Sapodilla belongs to the family Sapotaceae. In tropical and sub-tropical regions, the latex of the plant has been used in tribal medicinal practice to arrest the bleeding from minor injuries and to enhance the process of wound healing. Studies have demonstrated the role of proteases from plant latex in hemostasis and the process of wound healing.

In this study, we have evaluated *M. zapota* latex role in hemostasis. *M. zapota* latex is assessed for protein banding pattern by SDS-PAGE and proteolytic activity performed using casein as substrate. Inhibition studies were performed using specific protease inhibitors to know the type of protease. Specificities were analyzed for different substrates like gelatin, collagen and fibrinogen. Effect on blood coagulation was performed by recalcification time.

M. zapota latex has protein concentration of 5 mg/ml and serine protease having specific activity of 2.36 U/mg/ml. It showed substrate specificity for the tested substrates. It exhibited procoagulant activity by reducing clotting time in recalcification time from 143 to 35 sec. This is first report of serine protease from *M. Zapota* latex having procoagulant property.

P-I.10: STUDY OF THE EFFECTS OF CURCUMIN IN PREVENTION AND MANAGEMENT OF ALZHEIMER'S DISEASE BY SCOPOLAMINE INDUCED MEMORY IMPAIRMENT ANIMAL MODEL

Debabrata Dash
Dr Harisingh Gour University, University Road, Sagar, Madhya Pradesh 470003
Email: dashdebabrata97@gmail.com

Alzheimer's disease is a neurological disorder in which the death of brain cells causes memory loss and cognitive decline. By using scopolamine,the Alzheimer's disease is to be induced in mice model. And then it is to be treated by using curcumin. Treatment is to be analyzed by using different tests such as Behavioral test, it involves Y Maze test, Morris water test and Novel object test. These experiments are to be done before sacrificing the mice. Just before sacrificing, the blood is to be collected from the eye orbit of mice and further serum analysis is to be done. After sacrificing the mice using cryosectioning the slides of hippocampus region is to be analyzed.

Keywords: Alzheimer's disease, Scopolamine, Curcumin

P-I.11: WOMEN EMPOWERMENT THROUGH MACROALGAL CULTIVATION FOR BIOETHANOL WITH THE VALUE ADDED PRODUCTS

Deepthi Hebbale[1, 2] and T.V. Ramachandra[1, 2,*]

[1]Energy and Wetlands Research Group, Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012, Karnataka, India

[2]Centre for Sustainable Technologies, Indian Institute of Science, Bangalore 560012, Karnataka, India

** Corresponding author's E mail: tvr@iisc.ac.in; deepthih@iisc.ac.in*

Marine macroalgae are emerging as promising third generation feedstock for biofuel production. Many south eastern Asian countries have explored the potential of farming these macroalgal biomass in estuaries as well as in off shore aquaculture ponds. Macroalgal harvesting and pre-processing (70-80%) has been carried out by women farmers, paving way for young entrepreneurs through organization of self-help groups. India with its vast extent of coastal wetlands and paddy lands needs to explore seaweed cultivation, with the scope for sustainable livelihood empowering young women. However, naturally growing macroalgal biomass in *gazni* ponds in Aghanashini Estuary situated in Kumta Taluk, west coast of Karnataka, are being discarded due to lack of knowledge and also absence of appropriate market channels. This study explores the scope of macroalgal resource from *gazni* ponds for biofuel production with the commercially viable value-added products through market penetrations by enterprising youth. Seaweed is emerging as 'sea-wealth' evident from its potential as viable feedstock for biofuel and value added commercial products with the scope of transforming fortunes of women farmers from lower economic strata.

Keywords: Seaweed, macro algae, biofuel, bioethanol

P-I.12: EFFECT OF SOLVENTS AND TEMPERATURE CONDITIONS ON POLYPHENOLICS AND ANTIOXIDANT ACTIVITY OF AN ANTICANCER PLANT *RUBIA CORDIFOLIA* LINN

Deepti Tiwari, Pushpa Kewlani, I. D. Bhatt, R. C. Sundriyal
G. B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand, India
Email: pandeydeepti1990@gmail.com

Rubia cordifolia Linn. is a well-known medicinal plant that is reported to possess various biological activities such as anticancer, anti-microbial, anti-inflammatory, urinary disorders and antioxidant. Investigations carried out for extraction of polyphenolic content and antioxidant activity of *R. cordifolia* with varying solvents, solvent-water ratio, and temperature showed, maximum values of polyphenolic compounds (total phenol, total flavonoid, total tannin) and antioxidant activities in ethanol at 25^0 C. Highest total phenolic content (23.49±0.04 mg/g dry weight) was recorded in root with 70% acetone at 15^0 C, whereas highest total flavonoid (32.55±0.06 mg/g dry weight) and total tannin (14.97±0.03 mg/g dry weight) content were recorded in leaf with 70% ethanol at 25^0 C. Highest antioxidant activity were recorded in roots (5.53±0.01 mg/g dry weight) with 70% methanol at 25^0 C through Ferric reducing antioxidant power (FRAP) method. Presence of high content of polyphenolic compounds and antioxidant activity indicated that *R. cordifolia* might be considered as a potential source of natural antioxidant.

Keywords: Polyphenolic compounds, antioxidant activity, anticancer, extraction, solvents

P-I.13: ANALYSIS OF PHYTOCHEMICAL, ANTIMICROBIAL AND ANTIOXIDANT ACTIVITY OF AQUEOUS EXTRACT OF *GARCINIA GUMMI-GUTTA* LEAVES

M Flory Shobana*, M Mohammed Basha, S A Anu, G Sathya, S Vaishnavi
Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Sulur, Coimbatore, Tamil nadu
E-mail: floryshobana@gmail.com

Garcinia gummi-gutta belongs to Clusiaceae, has been used historically to treat respiratory infections (Oluyemi *et al*., 2007). Recently, a wide range of these plants have been screened for antimicrobial property. Because of the increased microbial resistance to antibiotics, toxic and harmful effects of few common antimicrobial agents, there is a continuous need for alternative therapies (Dhinahar and Lakshmi, 2011). The present study is carried out to evaluate antibacterial activities of leaves of *Garcinia gummi-gutta*. The result indicates that crude have great potential as antibacterial activity. Invitro antioxidant potential of was also carried out. *Bacillus subtilis*, *Staphylococus, Aspergillus niger* and *Aspergillus fumigates* shows maximum sensitivity against leaf extract.

Key words: Phytochemical, *Garcinia gummi-gutta,* anti-oxidant, anti-microbial

P-I.14: COMPARATIVE ESTIMATION OF ANTIDIABETIC, ANTIOXIDANT AND PHYTOCHEMICAL CONSTITUENTS OF *BUTEA MONOSPERMA* AND *VAR.BUTEA MONOSPERMA LUTEA*

Geeta Patel, Poonam Pandey, I.P. Tripathi and Ravindra Singh
Faculty of Science and Environment, M.G.C.G.V Chitrakoot Satna (M.P.)
Email: geeta9424@gmail.com

Butea Monosperma had been observing as potent, efficient, ethno medicine for various ailments in Indian traditional system of medicine. The present study was focus to investigate the antidabtic antioxidant potential and Phytochemical screening of *Butea monosperma*. In this study we have selected two types of Butea Monosperma. The *Butea monosperma* (red flower) showed highest antioxidant activity & lowest TPC and *Var. Butea monosperma lutea* (yellow flower) showed lowest antioxidant activity & highest TPC.

Keywords: *Antioxidant activity, Phytochemical Screening*, Antidabtic activity, Butea Monosperma, Var. Butea Monosperma Lutea

P-I.15: TAMARIND SEED COAT EXTRACTS INHIBITS OXIDATIVE STRESS-INDUCED PLATELET APOPTOSIS AND PLATELET AGGREGATION

Jayanna Kengaiah [a], Sharath Kumar M. Nandish[a], Chethana Ramachandraiah [a], Chandramma[a], Ashwini Shivaiah[a], Devaraja Sannaningaiah[a*]

[a]Department of Studies and Research in Biochemistry and Centre for Bioscience and Innovation, Tumkur University, Tumkur, 572103, India

E-mail: sdevbiochem@gmail.com

Hyper activation of platelets and oxidative stress-induced platelet apoptosis are the key events contributing to the progression of diseases such as thrombosis, arthritis, Alzheimer's, cancer and chronic inflammatory responses. Hence, inhibition of oxidative stress and platelet activation by natural agents may help in the better management of oxidative stress related diseases. The current piece of work deals with the role of Ethanol Extract of Tamarind Seed Coat extract (EETSC) on AAPH (2, 2'-Azobis (2-amidinopropane) dihydrochloride) induced platelets apoptosis and platelet aggregation. EETSC significantly ameliorates the oxidative stress-induced platelet apoptosis by restoring the various apoptotic markers such as ROS, particularly hydrogen peroxide, PS externalization, lipid peroxidation, protein carbonylation, mitochondrial membrane depolarization and cardiolipin peroxidation, level of GSH/GSSG, thiols, cytosolic Ca^{2+}, cytochrome C release, and caspase 3 activity. Furthermore, EETSC dose-dependently inhibited the platelets aggregation induced by agonists such as ADP, epinephrine, arachidonic acid, thrombin, platelets activating factor (PAF) and collagen in washed platelets. Thus, EETSC could be a better contender in the treatment regime of thrombosis and its related complications.

Keywords: Tamarind Seed Coat Ethanol Extract (EETSC), oxidative stress, platelets apoptosis, platelets aggregation.

P-I.16: TGF-Â1 EXPRESSION IN TISSUE SAMPLES MAY BE A PROSPECTIVE BIOMARKERS FOR ESOPHAGEAL CANCER SCREENING- A PILOT STUDY FROM NORTHEAST INDIA

Jayasree Talukdar[1,2], Eyashin Ali[1,2], Chenole keppen[1], Mallika Bhattacharyya[1,2], Subhash Medhi[1†]

[1]Department of Bioengineering and Technology, laboratory of Molecular Virology and Oncology, GUIST, Gauhati University, Gawahati, India

[2]Department of Gastroentrology, Gauhati Medical College Hospital, Guwahati, India

E-mail: subhashmedhi@gauhati.ac.in

Expression of TGF-â1 and TGF-âR2 gene were analysed by real time PCR in esophageal cancer cases.TGF-â1 showed upregulation in 60% blood samples (5.57± 3.87*) and 93.3% tissue samples (2.80± 1.29*) whereas expression of TGF-âR2 showed downregulation in 83.3% blood samples (0.40±0.28*) and 80% tissue samples (0.62 ± 0.68*). Expression of TGF-â1 is significant ($p<0.05$) with consumption of betel nut, gender and histopathology grade, while TGF-âR2 expression is significant with consumption of betel nut, alcohol and gender.Expression of TGF-â1 in tissue samples may be a prospective biomarkers for screening of EC among Northeast Population

*Mean fold change

Keywords: TGF-â1, TGF-âR2, esophageal cancer.

P-I.17: ANTI ANGIOGENIC EFFECT OF *PLUMBAGO ZEYLANICA* L. ROOT EXTRACT IN CHICK CHORIOALLANTOIC MEMBRANE MODEL

Jyotirmayee Sahoo, Samiran Behera, Shubhasmita Mohapatra, Hemanta Kumar Sahu and Priya Ranjan Debata*

P. G. Department of Zoology, North Orissa University, Takatpur, Baripada, Mayurbhanj, Odisha, 757003

E-mail: prdebata@gmail.com

Angiogenesis is a normal process in the body characterized by the formation of new blood vessels from existing vasculature. Abnormal angiogenesis is a denominator of many diseases. The study evaluated the effect of *Plumbago zeylanica* root extract on the angiogenesis of 6-days old chick embryos. Different concentrations (5 mg/ml, 10mg/ml, and 20mg/ml) of root extracts were administered on the chorioallantoic membrane (CAM) of 6-days old chick embryos. In a regular time interval (0, 24, 48, 72h), the secondary collaterals on the CAM were counted and compared with the control containing PBS. Results reveal that *Plumbago zeylanica* root extract suppressed angiogenesis.

Keywords: *Plumbago zelynica*, Anti-Angiogenesis, CAM

P-I.18: ISOLATION, CHARACTERIZATION AND BIOCONTROL EFFICACY OF ENTOMOPATHOGENIC NEMATODE *STEINERNEMA CARPOCAPSAE* AND *STEINERNEMA MONTICOLUM* (NEMATODA: *STEINERNEMATIDAE*) ON LEPIDOPTERAN PEST *SPODOPTERA LITURA*

K. Lalitha and Muthugounder Subramanian Shivakumar
Molecular Entomology Lab, Department of Biotechnology, School of Biosciences, Periyar University, Salem - 636 011, Tamil Nadu, India
Corresponding author's E mail: sk24@periyaruniversity.ac.in*

Management of insect pests has been a constant challenge since the dawn of the agriculture. Several insect control methods have been employed, of which chemical control has gained widespread acceptance. As an undesirable part, the insects develop resistance against particular chemical insecticide which makes it ineffective. Thus, alternative eco-friendly control methods using bacteria, fungi and nematodes are being explored. EPNs are used as a capable bio-control agent to control agricultural insect pest because of its easy penetration to host and its pathogenicity. The efficacy of nematode is affected by high temperature and their effectiveness in tropical and subtropical regions. May result in a reduced impact on the pest. Whereas in our present study we isolated two EPNs strains GNAF1 and MAF2 that exhibit high virulence and pathogenicity in *Spodoptera litura* larva. The strains were effective when tested at higher temperatures of 30° C and 40° C. Based on 18s rDNA sequence these strains were identified as *Steinernema carpocapsae* and *Steinernema monticolum*.

Keywords: Entomopathogenic Nematode, Agriculture field, Insecticides, Pathogenecity, Temperature, *Spodoptera litura*

P-I.19: A STUDY TO FIND OUT THE THYROID SCREENING IN URBAN PREGNANT WOMEN

Kumari Sushma Saroj
Department of Zoology, Dr. L.K.V.D. College, Tajpur, Samastipur, L.N. Mithila University, Darbhanga, India
E-mail: drssaroj9@gmail.com

Thyroid hormones play major roles in the regulation of a wide range of metabolic and physiologic processes, but the genes and environmental factors that affect normal concentrations is largely unknown using quantitative genetic methods. Thyroid hormone is critical to normal development of the baby's brain and nervous system. In investigations to study of complete thyroid profile of all antenatal patients was done at the first antenatal visit along with routine tests. The aim of the study was to study the prevalence of hypothyroidism and hyperthyroidism in low income, urban pregnant women. A total of 200 pregnant women were included in this study. The Results showed 34% prevalence of hypothyroidism of which 30% being subclinical hypothyroidism and 4% overt hypothyroidism. There was 9.5% prevalence of hyperthyroidism of which 5.5% being subclinical hyperthyroidism and 4% overt hyperthyroidism. It shows a very high prevalence rate of hypothyroidism in the patients attending the antenatal outpatient department of Govt. Hospital, Samastipur, Bihar. This justifies the inclusion of thyroid profile test as a routine test in the antenatal profile.

Keywords: Pregnancy; Hypothyroidism; Subclinical hypothyroidism; Prevalence

P-I.20: EXTRACTION AND CHARACTERIZATION OF GELATIN FROM FISH SCALES (*LABEO CATLA*) AND ITS ANTIARTHRITIC ACTIVITY

Lucky Priya, S.P.Kamble and Sonali Das
Center for Biotechnology, Pravara Institute of Medical Sciences
Deemed To Be University, Loni-BK, Ahmednagar (MS) India
**Corresponding Authors E-Mail Id:-luckypriya510@gmail.com*

Gelatin extracted from fish sources is one of the best alternatives to replace the Porcine and bovine gelatin.The best parts of the fish are the scales and the bones which are rich in collagen which can be the great source of gelatin. In this study the gelatin was extracted from the scales of fish namely Catla *(Labeo catla)* were used. The extraction was done by heating the scales in distilled water for 18 hours at 70°C and by cooling the scales in distilled water for 64 hours at 4°C. The results showed that the scales gelatin by cooling method gives higher yield as compared to the heating method. Gelatin is widely used biopolymer in various industries due to its excellent biocompatibility, biodegradability properties.

Rheumatoid arthritis is a major ailment among rheumatic disorders. A large number of herbal medicines and natural products are used for treatment of various types of rheumatic disorders. Gelatin extract, an natural product was reported to have anti-arthritic activity, *in-vitro*

as well as *in-vivo.* The present study deals with anti-arthritic activity *in-vitro*. Various *in-vitro* anti-arthritic pharmacological models were studied, such as, inhibition of protein denaturation and effect on membrane stabilization. Two types of gelatin extract with two different concentrations (100/250~g/ml) was used and results were compared with acetyl salicylic acid (250~g/ml).The gelatin extract showed dose dependent activity which was found to be better than that of acetyl salicylic acid.

Key words: - Gelatin, Carla, Scales, Rheumatoid Arthritis, Anti-arthritic

P-I.22: ZINC STRESS RESULT IN ACTIVATION OF IMMUNE AND ANTIOXIDANT RESPONSE IN *SPODOPTERA LITURA* (LEPIDOPTERA: NOCTUIDAE)

M. Arunthirumeni, B. Subha Priya and Muthugounder Subramanian Shivakumar*
Molecular Entomology Laboratory, Department of Biotechnology, School of Biosciences, Periyar University, Salem - 636 011, Tamil Nadu, India
Corresponding author E mail: sk24@periyaruniversity.ac.in*

Zinc is an important trace element in the biological system. It plays an important role in the immune system. It is a cofactor in many proteins and various antioxidant enzymes. If the level of zinc is increased it causes several physiological problems. In the present study we performed various test on growth, development, survival rate, immune response of total haemocyte count and differential haemocyte count and antioxidant response of Superoxide dismutase, Catalase, Peroxidase, Glutathione peroxidase, Glutathione-S-transferase on *Spodoptera litura* in various zinc concentration. High level of zinc shows toxicity in *Spodoptera litura.* Antioxidant activity Superoxide dismutase, Catalase, Peroxidase, Glutathione peroxidase, Glutathione-S-transferase levels were significantly increased in fat body tissues when compare to the midgut tissue. In the test we observed 50 – 200 µg/g improves the immune and antioxidant response in *Spodoptera litura* based on the study we concluded that up to 200 µg/g of zinc is permissible and responsible for various physiological functions an insects.

Keywords: Zinc, *Spodoptera litura,* Antioxidant enzymes, Haemocyte, Immune response

P-I.23: PRODUCTION OF L-ASPARAGINASE FROM MIXED SOLID SUBSTRATE BY *ASPERGILLUS TERREUS* MTCC 1782

Vankdoth Sasikala[a], Meena Vangalapati[*b]
[a]Department of Chemical Engineering, AUCE (A), Andhra University, A.P, India
*[*b]Dept of chemical Engineering, AUCE (A), Andhra University, A.P, India*
E-mail: meena_sekhar09@yahoo.in

L-Asparaginase (L-asparagine amido hydrolase, E.C.3.5.1.1) is an important enzyme used as an anticancer agent. In this present work, the production of L-asparaginase under solid state fermentation was carried out by Aspergillus terreus MTCC 1782 using agricultural products. Among different agricultural products (Sapota peel, Pumpkin) screened, Sapota peel and Pumpkin were selected and these two were mixed in different ratios for obtaining maximum enzyme activity. Out of these combinations tested the ratio of 2.5:2.5 of Sapota peel (Manilkara zapota) and Pumpkin (Cucurbia pepo) supported maximum L-asparaginase production. The optimization of fermentation parameters such as fermentation time (120 hrs), temperature 35°C, moisture content 60%, pH 8, inoculum volume 1ml, carbon source such as glucose, nitrogen source such as sodium nitrate, metal ions such as calcium chloride and L-asparagine concentration 1.0% by Aspergillus terreus MTCC 1782 using sapota peel and pumpkin as substrate under solid state fermentation inoculated with 1 ml of 4 day old fungal culture and incubated at 35°C for 120 hrs. Both physico-chemical and nutritional parameters had played a significant role in the production of the enzyme L-asparaginase. The medium mixed substrates with optimized condition and supplements gave a maximum L-asparaginase activity as 956.6 U/gds which increase yield when compare to medium of Sapota peel (232.3 U/gds) and Pumpkin (232.3 U/gds) alone.

Keywords: L-Asparaginase, agricultural products, anticancer agent, Aspergillus terreus

P-I.24: CHARACTERIZATION OF *BACILLUS SUBTILIS* ISOLATED FROM RAW MILK SAMPLES AS POTENTIAL PROBIOTICS

N. S. Meera[#] and M. Charitha Devi*
Department of Virology, Sri Venkateswara University, Tirupati, A.P. India
E-mail:nsmeera378@gmail.com

Probiotics are vital bacteria that colonize the intestine and modify its microflora, which is benefit for the host. Milk is a highly nutritious food that can be obtained from a variety of animal sources such as cows, goats, sheep and buffalo, as well as humans, for human consumption. Very few members of the Bacillus group isolated from raw milk are recognized as safe for use and hence only a few strains are available as commercial preparations for application in humans and animals. Spore-forming bacilli are being explored for the production and preservation of food for many centuries. Bacillus spp. is gaining interest in human health related functional food research coupled with their enhanced tolerance and survivability under hostile environment of gastrointestinal tract. Further, Bacillus strains also possess biotherapeutic potential, which is connected with their ability to interact with the internal milieu of the host by producing variety of antimicrobial peptides and small extracellular effector molecules.

In the present study, milk samples of the following native cow breeds - Sahiwal, Gyr, Kankrej, Kapila, Kangayam, Berki, Ongole and Jersey were collected at Sri Venkateswara Gosamrakshanashala TTD, Tirupati and screened for probiotic microorganisms and the selected strains has been characterized using 16 S r RNA analysis. *Bacillus subtilis* was identified as potential spore forming probiotic and is stable over a wide range of temperatures with potential applications in a variety of formulations and foods. It was hence of interest to confirm its safety as repeatedly emphasis is laid on the importance of strain specificity in probiotics. Moreover, the growing need to evaluate the safety of individual Bacillus strains as well as species identification for probiotic candidates are also taken into consideration.

Key words: Native cow milk, *Bacillus subtilis*, probiotic properties, characterization

P-I.25: ANTIDIABETIC EFFECT OF PLANT EXTRACT OF *PSIDIUM GUAJAVA* (BETA SITOSTEROLS) IN COMBINATION WITH ORAL HYPOGLYCEMIC AGENTS METFORMIN IN CELL LINES

Namrata Dwivedi, Ruchi Dwivedi and I.P.Tripathi
Faculty of Science & Environment, M.G.C.G.V.,Chitrakoot, Satna (M.P.)
E mail: namratadwivedi5@gmail.com

Diabetes mellitus is known serious problem to the global population due to the alarming diabetic complications it leads to. The current therapeutic options available can be improved for better efficiency and maximum benefits. Combination therapy has been commonly used to improve the efficacy and to minimize the side effects of drugs in current clinical use**.**The present study aims to assess the interaction between a natural molecule beta sitosterol with the commercially available oral hypoglycemic drugs metformin in diabetic SBGS cell line. In this study, we performed Antioxidant assay and ROS analysis followed by Antiodiabetic assay alpha glucosidase and alpha amylase assay.on the bases of its good activity we performed. In vitro cytotoxicity and glucose uptake studies were performed in SBGS cells. Based on experimental data, the combination index of the hypoglycemic drugs metformin in combination with different doses of plant extract was determined by multimode reader (BIOTEck) and flow cytomety**.** The in vitro studies on SBGS cells suggest a positive interaction of beta sitosterol with metformin at specific concentrations as evidenced by glucose uptake. The intestine and pancreatic enzymes, alpha glucosidase and alpha amylase expression confirmed the results of the in vitro studies. Both the combinations of metformin with plant extract exhibited potent antidiabetic effect. The combination of plant extract with metformin was insulin dependent (Akt pathway).The overall results suggest that combination of metformin with plant extract reduce blood glucose level.This combination therapy can be translated for its clinical use as a diabetes management strategy.

Keywords: Combination therapy, type 2 diabetes mellitus, SBGS cells, metformin

P-I.26: *IN VITRO* ANTIMALARIAL EFFICACY OF *PONGAMIA PINNATA* (L) PIERRE AGAINST *PLASMODIUM FALCIPARUM* (3D7 STRAIN)

P.V.V. Satish[1]* and K. Sunita[2]
[1]Department of Zoology, VSM Degree & PG College, Ramachandrapuram-533255, Andhra Pradesh, India
[2]Department of Zoology and Aquaculture, Acharya Nagarjuna University, Nagarjunanagar-522510, Guntur, Andhra Pradesh, India
**Corresponding author Email: psatish728@gmail.com*

The objective of the current study was to assess the antiplasmodial activity of *Pongamia pinnata* (leaves, stem, flowers and roots) against chloroquine-sensitive *Plasmodium falciparum* (3D7 strain) and cytotoxicity against Brine shrimp larvae and THP-1 cell line. The plant *Pongamia pinnata* was collected from herbal garden of Acharya Nagarjuna University of Guntur district, Andhra Pradesh, India. Sequentially crude extracts of methanol, chloroform, hexane, ethyl acetate and aqueous from dried leaves, stem, flowers and roots of *P. pinnata* have been extracted by soxhlet apparatus. The extracts were screened for *in vitro* antimalarial activity against *P. falciparum* 3D7 strain. The cytotoxicity studies of crude extracts were conducted against Brine shrimp larvae and THP-1 cell line. Phytochemical analysis of the plant extracts was conducted by following the standard methods. As part of the study, the chemical injury to erythrocytes of extracts was checked. Out of these tested extracts, the methanol extract of bark of *P. pinnata* has shown very minimal IC_{50} value (11.67 µg/ml) and cytotoxicity evaluation revealed that this extract was not toxic against Brine shrimp and THP-1 cells. The injury to erythrocytes due to chemical nature of extract was also assessed and it has not shown any morphological alterations and damage to the erythrocytes after 48 h of incubation. The present study is useful to develop new antimalarial drugs in the scenario of the growing resistance to the existing antimalarials. Thus, additional research is needed to characterize the bioactive molecules of the extracts of *P. pinnata* that are responsible for inhibition of malaria parasite.

Keywords: *Pongamia pinnata,* Antimalarial activity, Cytotoxicity evaluation, phytochemical analysis, IC_{50}, Selectivity index, Erythrocytic injury.

P-I.27: MOSQUITO-LARVACIDAL ACTIVITY OF INDIAN BORAGE, PLECTRANTHUS AMBOINICUS (LOUR.) SPRENG AGAINST DENGUE VECTOR, *AEDES AEGYPTI*

Paramasivam Deepak, Alagappan Palanisamy, Pachiappan Perumal
[a] *Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Sulur-641402, Tamil Nadu, India*
[b] *Department of Biotechnology, School of Biosciences, Periyar University, Salem - 636 011,India*
**E-mail: perumalarticies@gmail.com*

The present study focuses on the mosquito-larvicidal efficacy of Methanol, Ethyl acetate and Hexane extracts of *Plectranthus amboinicus.* The mosquito-larvicidal assays of ethyl acetate and methanol extracts of *P. amboinicus* showed the maximal activity with minimal concentration against the fourth instar larvae of *Aedes aegypti* showed LCso and LC90 values (ug/ml.): 13.64 & 86.09 and 53.36 & 92.51, respectively. The extracts were analysed by Fourier Transform Infrared Spectroscopy and High Performance Liquid Chromatography techniques for their functional groups studies. In view of the recorded mosquitocidal properties, *P. amboinicus* could be tried as an alternative/effective source for the mosquito control agent.

Key words: *Aedes aegypti;* Cold percolation; Mosquito-larvicidal; Plant extract; *Plectranthus amboinicus*

P-I.28: SIGNIFICANCE OF MUTATION SCREENING IN FAMILIAL STEROID RESISTANCE NEPHROTIC SYNDROME: AN INVESTIGATION FROM SOUTH INDIA

Parveen Jahan[1], Asra Tabasum[2], Wali unnisa[2], Umme Najiya Mahwish[2]
[1]Department of Zoology, Moulana Azad National Urdu University, Hyderabad, India [2]Department of Genetics, Osmania University, Hyderabad, India
Email: jahanparveen95@gmail.com

We screened six south Indian families presenting with steroid resistant nephrotic syndrome (SRNS) for ten mutations, 8 in NPHS2 and 2 in á-actinin4 gene using PCR technique. These mutations were identified in five families; compound heterozygosity (exon 5, 6), a mutation in both NPHS2 and á-actinin4, mutation in exon 1 and 7 of NPHS2 gene and exon 5 polymorphism in homozygous state. The mutant products are known to be heterogenous in sub cellular localization, either retained in ER or endosome, with decreased plasma membrane expression. Hence, elucidation of genetic factors associated with SRNS may allow genetic screening, greater understanding of etiopathogenesis and enhanced therapeutic approaches.

Key words: Steroid resistant nephrotic syndrome, gene mutations, NPHS2, á-actinin 4

P-I.29: ELUCIDATING THE METABOLIC ADAPTATIONS LEADING TO DRUG RESISTANCE IN *LEISHMANIA*

Payel Das, Saradindu Saha and Somdeb Bose Dasgupta
Molecular Immunology and Cellular Microbiology Laboratory
Department of Biotechnology, Indian Institute of Technology Kharagpur
Email: payeldas92@yahoo.in

In order to obtain an insight into the mechanism through which drug-resistance evolve in *Leishmania* through metabolic adaptations we generated gradually adapted parasites resistant to norclomipramine which targets essential enzyme Topoisomerase IA. qPCR analysis as well as immunoblotting revealed down regulation of target gene and up regulation of the ER chaperone LdGRP78. A drug induced ER stress led to Unfolded-Protein-Response (UPR) which in turn triggered ER-associated-degradation (ERAD). This led to increased proteasomal degradation of LdTOPIA. To prevent ER stress mediated induction of apoptosis overexpressed LdGRP78 trans located to mitochondria to chelate Ca2+ and prevent loss of mitochondrial-membrane-potential and thereby cell death.

P-I.30: ANTINOCICETPTIVE ACTIVITY OF QUERCETIN-3-RHAMNOPYRANOSYL-(1-6) GLUCOPYRANOSIDE ISOLATED FROM *DELONIX ELATA*

Pradeepa K[a*], Krishna V[b] and Varunakumara J.B[c]
[a*]*Department of Biotechnology, Sahyadri Science College, Shimoga, Karnataka*
[b]*Department of Biotechnology, Kuvempu University, Shankaraghatta, Karnataka*
[c]*Department of Biochemistry, Sahyadri Science College, Shimoga, Karnataka*
E-mail: pradie.k@gmail.com

The objective of this study was to investigate the antinociceptive activity of the quercetin-3-rhamnopyranosyl-(1-6)glucopyranoside (QRG) isolated from *Delonix elata* stem bark extract. The antinociceptive effect of the QRG was observed by two tests: acid-induced writhing test and tail flick response in mice. The QRG was orally administered at a dose of 50 mg/kg. Acetylsalicylic acid was the standard drug (50 mg/kg, orally). QRG showed a 61.96% inhibition ($p < 0.05$) of the pain threshold in acetic acid-induced writhing model. In tail flick response also QRG exhibited a significant ($p < 0.05$) antinociceptive activity by extending the reaction time of the animals.

Keywords: *Delonix elata*, Antinociception, Tail flick response, Writhing test, Acetylsalicylic acid

P-I.31: ISOLATION AND PRODUCTION OF BROAD ANTIBACTERIAL METABOLITE FROM NOVAL ACTINOMYCETES *STREPTOMYCES ENISSOCAESILIS* PVNRHB2 FROM BAY OF BENGAL

Priyanka Peddi, Besetty Rohit Sri Srinivas, Gunturu Mary Ratna Grace, Donthireddy Sri Rami Reddy, Nikku Murali Yugandhar

Centre For Biotechnology, Department Of Chemical Engineering, A.U. College Of Engineering, Andhra University, Visakhapatnam, Andhra Pradesh.

Email: priyankapeddi99@gmail.com

Recently, the increase of the pathogens resistant to antimicrobial agents has become a health problem. The study aimed at the isolation of marine actinomycetes that is capable of producing antibacterial activities. Seven marine sediment samples were collected from geographically different areas of East and West coast of India. Altogether 45 actinomycetes were isolated and were tested for their antimicrobial activities against different test bacteria to obtain potent actinomycetes. Among them, 10 isolates have showed broad antibacterial activity against different test bacteria. These 10 isolates were further screened and isolate B2 has shown strong and broad antibacterial activity against all the test bacteria. The isolate B2 was identified as *Streptomyces enissocaesilis* and deposited in GenBank with accession number was MH480670.

Keywords: Actinomycetes, Antibacterial activity, Amylase activity, Streptomyces

P-I.32: MOLECULAR DOCKING STUDIES ON POTENTIAL PPAR-Ã AGONIST FROM *PRENYLATEDGUAIANES*

Pujala Shivakrishna and Estari Mamidala
Infectious Diseases Research Lab, Department of Zoology, Kakatiya University, Warangal-506009, Telangana State, India
Email: shivakrishnapujala666@gmail.com

The rates of type 2 diabetes (T2D) are rising to epidemic proportions in India and worldwide. Anti-T2DM lead prioritization was performed on a set of known compounds from *PrenylatedGuaianes*. The Docking experiments were done using Autodock software for seven compounds docking with PPAR-gamma. In the present study, three compounds [Dolabellane (-11.17), Xeniane (-10.39), Dictyol C (-9.72)] indicated high binding score. Dolabellane was found to be a lead with better docking scores. The residues of PPAR-gamma were might play an important roles in binding with these compound. The results showed that there is scope for the improvement of activity of Dolabellane analogs to discover a potent anti-T2DM compound docking,PPAR, *PrenylatedGuaianes*, Diabetes mellitus.

Key Words: PPAR, *Prenylated Guaianes*, Diabetes mellitus

P-I.33: STUDIES ON THE IMPACT OF CHLORPYRIFOS AND CYPERMETHRIN AND THEIR COMBINATION ON THE STRESS PARAMETERS OF EARTHWORM, *EUDRILUS EUGENIAE*

Rishikesh K. Tiwari and Ravi S. Pandey*[a]

[a] *Department of Biochemistry, University of Allahabad, Allahabad-211002, India*

**Corresponding author e-mail: rspandey2004@yahoo.com*

Earthworms play crucial role in ecological balance by increasing the soil fertility. Pesticides applied to agricultural practices affect their health adversely. The present study was aimed to explore the impact of chlorpyrifos and cypermethrin and their combination on stress parameters of earthworm, *Eudrilus eugeniae*. Significant alterations in SOD, CAT, GST and content of GSH and LPO were observed against exposure of pesticides at sub-lethal concentration. This may adversely affect the health of earthworm and decline their population and intern affecting the yield of the agricultural product.

Key words: Catalase, chlorpyrifos, cypermethrin, *Eudrilus eugeniae*, SOD, LPO, GSH and GST

P-I.34: PROTECTIVE EFFECT OF SYNTHESIZED GREEN TEA AGAINST CYCLOPHOSPHAMIDE INDUCED PROSTATIC DAMAGE IN MALE ALBINO RATS: A BIOCHEMICAL, HISTOLOGICAL STUDY

S. Prabhudas and M. Mastan*
Department of Biotechnology, School of Herbal Studies and Naturo Sciences, Dravidian University, Kuppam, A.P, India
E-mail: sdasprabhu@gmail.com

Synthesized Green Tea (SGT), Camellia sinensis has a lot of therapeutic effects to treat as an anti-oxidant and anti-cancer agent. The study aimed a protective role of SGT in ameliorating the toxic effects of CP overdose in the rat prostatic tissue. These specimens were processed for biochemical, histological and studies. Results showed up in CP treated group were significant increase in prostatic (MDA) and (CRP) and a significant decrease in (GPx) in prostatic tissue compared with control group. Histological changes marked acinar, stromal prostatic degeneration. Findings revealing SGT provided biochemical and histo-pathological improvement in CP induced prostatic tissue toxicity.

Keywords: Male Albino rat, *Camellia sinensis,* Cyclophosphamide, Antioxidant enzymes

P-I.35: GREEN SYNTHESIS OF NANO PARTICLES FOR CANCER CELLS

S.T.Girisha
Department of Microbiology and Biotechnology, Jnanabharathi campus, Bangalore University, Bangalore-560056, India
E mail: stgirisha@gmail.com

The antioxidant and cytotoxicity activity of *Rhus succedanea, Rheum emodi* and *Gardenia gummifera* were determined by using invitro methods and documented the polyherbal potency in cancer cell proliferation. The influence of polyherbal combination altered biochemical and molecular marker and demonstrated the cytotoxic activity was time and dose depended manner. The IC -50 established found to be effective dose and attaining maximum percent induction of apoptosis which were delivered with DMSO. The phyto-chemical analysis of these compositions was done by using GCMS and revealed the chemo preventive agents against prostate cancer. Furthermore this polyherbal extract was used and prepared silver nano particles for the exploration of the potency in PC-3 cells vs. only polyherbal extract. Nano particles were characterized using TEM, XRD, EDAX and FTIR and confirmed the suitability of nano delivery and therapeutic value.

Key words: Polyherbal, Nano Particles, Antiproliferation, Prostate Cancer

P-I.36: EXPLORATORY STUDIES OF *OCIMUM SANCTUM* BIOACTIVE COMPOUND IN SODIUM FLUORIDE (NAF) INTOXICATED RATS

M. Siva[1], K. R. Shanmugam [1]*, S. Ravi [2], B. Shanmugam[2] G. Venkata subbaiah[2] K Sathyavelu Reddy [2]

[1] Department of Zoology, T.R.R. Government Degree College, Kandukur, A.P
[2]Division of Molecular Biology and Ethanopharmacology, Department of Zoology, Sri Venkateswara University, Tirupati – 517 502, India
Corresponding Author's E mail: krshanmugamphd@gmail.com

The present study was designed to explore the antioxidant potential of bioactive compound of *Ocimum sanctum* on the hepatic antioxidant enzymes in sodium fluoride intoxicated rats. Male Wistar rats were allocated into five groups (n=6 per group): Normal control rats (Nc), Bioactive compound treatment (BT), fluoride control (FC), Bioactive compound +Fluoride (B+Ft) and fluoride +Vitamin c treatment (F+VcT) and treatment was given for 30 days. After 30days we have estimated the antioxidant enzymes, in all groups. SOD, CAT, GPX, GR, GSH activities are decreased and MDA levels increased in fluoride intoxicated rats. However with Bioactive compound treatment all these parameters came back to near normal levels. Histopathological results indicated that the bioactive compound supplementation protected the liver tissue from fluoride toxicity. Hence, Ocimum can be used as antifluoride agent.

Key words: Fluoride toxicity, *Ocimum sanctum*, antioxidant enzymes, rats

P-I.37: A COMPARATIVE STUDY OF STABILITY, ANTIOXIDANT, ANTIFUNGAL AND ANTIBACTERIAL ACTIVITIES OF GREEN AND CHEMICALLY SYNTHESIZED GOLD NANOPARTICLES

Shiva Shirotiya, Bhanumati Singh, V. S. Chauhan
Department of Biotechnology, J.C. Bose Institute of Life Science
Bundelkhand University Kanpur Road Jhansi-284128
E mail- shiva.shirotiya@gmail.com; bhanumati_singh@rediffmail.com

Gold Nano Particles (AuNPs) have drawn growing interest in comparison to their macro-scale counterparts owing to their distinctive physical, chemical and biological characteristics. Gold nanoparticles have a broad variety of applications in studies, industry and biomedicine that make it vital to create a low price and environmentally friendly strategy with prospective scaling. Green synthesis of nanoparticles through bio-reactions could be an acceptable choice with no extra reduction chemicals leading to a decrease of gold ions to particles. In addition, the techniques simplicity in scale-up procedures makes it more effective than methods of chemical and physical synthesis. *Punica granatum* peel extract and sodium citrate were used in this research to produce gold nanoparticles as biological and chemical reducing and stabilizing agents. The primary objective is to compare characteristics and assess nanoparticles synthesized through two approaches to antibacterial and antifungal activity. Comparison of size and morphology between the two kinds of UV-Visible spectroscopy synthetic nanoparticles, Zeta potential, SEM, FTIR, XRD and their antibacterial and antifungal impacts were assessed through area inhibition. Our research also concentrated on antioxidant activity of gold nanoparticles that were differently synthesized. Study shows AuNPs showing powerful antimicrobial and antimicrobial activity against pathogenic bacteria and fungus. The green nanoparticles showed significant antioxidant and antimicrobial activity compared to nanoparticles that were chemically synthesized. Compared to chemically synthesized nanoparticles, the green synthesized gold nanoparticles have more desirable features and biological activities.

Keywords:- Gold nanoparticles, green synthesis, chemical synthesis, antibacterial, *Punica granatum*

P-I.38: NANOFORMULATION PREPARATION OF PLANT CONSTITUENT FOR CANCER THERAPY

Shraddha Srivastava[1,2], J. Mathew[2], A.C. Pandey[1]
[1] *Nanotechnology Application Centre, University of Allahabad, Allahabad*
[2]*Department of Biotechnology, Bundelkhand University, Jhansi*
E mail: 2shraddhabiotech@gmail.com

In present study, we developed nanoformulation of baicalein. As baicalein is a hydrophobic in nature, so we have prepared oil in water nanoemulsion by homogenization & sonication method. Initially 9 formulations were prepared and examined physicochemical property. Globule size and zeta potential of optimized nanoemulsion was estimated to be 205 nm and -16.79 mV respectively. Poly dispersitivity Index was 0.310 and entrapment efficiency was approximately 93.78%. Cummulative drug release of optimised formulation was upto 68% after 24 hrs that shows sustained release behaviour. Hence it is concluded that prepared baicalein nanoformulation can be further studied for in-vitro and in-vivo studies

Keywords: Nanoemulsion, baicalein

P-I.39: CHLOROFORM EXTRACT OF *NERIUM OLEANDER* L. INHIBITS CELL PROLIFERATION AND MIGRATION IN HELA CERVICAL CANCER CELLS

Shubhasmita Mohapatra[1], Anil Kumar Biswal[2] and Priya Ranjan Debata[1]*
[1]P. G. Department of Zoology, North Orissa University, Takatpur, Baripada, Mayurbhanj, Odisha, 757003
[2]P. G. Department of Botany, North Orissa University, Takatpur, Baripada, Mayurbhanj, Odisha, 757003
E mail: prdebata@gmail.com

Cervical cancer is the third most common type of cancer and mostly caused by persistent infection of Human Papilomavirus (HPV). Active phytocompounds derived from several medicinal plants are highly potential in treating cancer including cervical cancer. In this study, several plant species have been screened using MTT based assay in HeLa cervical cancer cells. The data reveal that the plant *Nerium oleander* is found to be superior among others based on their cytotoxic effect. Cell migration was studied by in vitro scratch assay. Our results reveal that the *Nerium oleander* extract inhibits cell migration in a dose dependant manner.

Key words: *Nerium oleander*, HeLa cell, MTT assay, cell migration, antioxidant

P-I.40: CUMIN DERIVED COMPOUND INHIBIT CELL PROLIFERATION AND INDUCE APOPTOSIS AND DNA FRAGMENTATION IN OVARIAN CANCER CELL

Souvik Das[1], Ritwik Maity[1], Biswarup Basu[1], Amlan Das[2]
1) Department of Neuroendocrinology and Experimental Hematology, Chittaranjan National Cancer Institute, Kolkata 700026, India
2) Department of Chemistry, National Institute of Technology Sikkim, Sikkim, India
E mail: souvik_das1@live.com

Cumin (*Cuminum cyminum*) commonly known as Jeera, used as flavouring agents. Most important chemical composition of cumin essential oil was cuminaldehyde. Cuminaldehyde (4-isopropylbenzaldehyde) a natural monoterpenoid, having antimicrobial and antifungal activity. In the project we evaluated its anticancer activity in aggressive and cisplatin resistance ovarian cancer cell lines. The data shows effective inhibition of proliferation and apoptosis of ovarian cancer cell lines mostly by inhibiting DNA synthesis. In addition, cuminaldehyde also induced lysosomal vacuole acidification and suppressions of both topoisomerase I & II activities in a dose-dependent manner. Results suggest that cuminaldehyde could be a potential agent for anticancer therapy.

Keywords: Cuminaldehyde; Natural compound, Small molecule, Ovarian Cancer, Apoptosis, Cisplatin resistance

P-I.41: A REVIEW OF CHEMO-SENSORS FROM DENGUE VECTOR *AEDES AEGYPTI* AND ITS RELATED STRUCTURES FROM 10 ORGANISMS

Subrata Ganguli

National Center for Biological Sciences, GKVK Campus, Bangalore 560065
Current Address: "SENDRA ACADEMY", Jitendra Apartments, Flat 07, 59 D.P. road, Dum Dum (South), Kolkata 700028, W.B. India
Email: vvbusy@yahoo.com

Chemo-sensing in the animal kingdom is of wide interest to modern biologists because of its importance in social behavior. The knowledge derived is useful in generalizing the understanding of molecular recognition. Several applied aspects, especially in pesticidal and immunotherapeutic approaches, are obvious outcome of such detailed and advanced molecular research. In this paper I collate 38 structures from 10 organisms made available from the open access public domain protein data bank (PDB) to draw attention to their salient features. 24 out of the 38 reviewed belong to the PBP_GOBP super family, and 5 of them belong to the lipocalin family.

Keywords: 3-D structure of protein, X-ray crystallography, Odour-binding proteins, Dengue fever

P-I.42: EVALUATION OF ANTIMICROBIAL POTENCY AND SYNERGISM OF *CHLOROPHYTUM BORIVILIANUM* IN COMBINATION WITH ANTIBIOTICS

Suniti Yadav[1], Vinay Singh Chauhan, Bhanumati Singh
Department of Biotechnology, Budelkhand University, Jhansi, 284128, India
Corresponding author's e-mail: yadav.suniti@gmail.com

Methanol extract of *Chlorophytum borivilianum* roots, flowers, leaves were used to investigate *in vitro* antimicrobial activity against *E.coli, Pseudomonas aeruginosa, Bacillus cereus, Klebsilla pneumonia, Vibrio parahaemolyticus, Aspergillus niger, Candida albicans, Staphylococcus aureus.* Antimicrobial activity analysed by using agar well diffusion method using varying concentrations of extracts. Results of Minimum inhibitory concentration are determined by microbroth dilution method using ALAMR dye against selected microorganisms. Synergism was evaluated in combinations with Streptomycin, Gentamycin, Ketoconazole by Checker board methods. Activity of antioxidant is assessed by DPPH free radical scavenging method. On preliminary study as secondary metabolites phytochemical testing has revealed the presence of Phenols, Tannin, Tri-terpenoidal saponins, and alkaloids. Hence the result of the study confirms that the Chlorophytum borivilianum is a plant of ethno medical importance.

Key Words: - *Chlorophytum borivilianum*, synergism, Antioxidant, Checker board

P-I.43: DEVELOPMENT OF RECOMBINANT ADENOVIRUS EXPRESSING RABIES VIRUS GLYCOPROTEIN AS AN ORAL VACCINE CANDIDATE FOR RABIES IN DOGS

Supraja Reddy[1], S Gauthami[1], Pavuluri Panduranga Rao[1a]

[1]Ella Foundation, Genome Valley, Turkapally, Shameerpet Mandal, Hyderabad–500078, India

[a]Biovet Private Limited, Malur, Karnataka -563130

Corresponding Author's Email: raopp@biovet.in

Rabies is a zoonotic disease caused by Rabies virus. India accounts for 36% of the world's death due to rabies. Though rabies is 100% preventable through vaccination, the control of human rabies is complicated due to the presence of stray dogs. Therefore, an effective rabies control in humans necessitates the vaccination of stray animals. Adenoviral vectors are widely employed against infectious diseases as they elicit both T and B- cell response. Here we report the development of recombinant Adenovirus expressing the rabies glycoprotein as an oral vaccine candidate for prevention and control of rabies in dogs and other wild animals.

Key words: Adenovirus, Glycoprotein (G), Rabies virus

P-I.44: BACTERIAL AGGLUTINATING LECTIN FROM THE LEAVES OF *MADHUCA NERIIFOLIA* (MOON) H.J. LAM

Surya P H, Elyas K K*
Department of Biotechnology, University of Calicut, Kerala, India
**Corresponding author's e mail: - *kkelyas@yahoo.com; suryapharidas2011@gmail.com*

Lectins are proteins possessing the ability to bind sugars or glycan residues in a specific and reversible way. Lectins are growing as biological recognition molecules to unveil the surface architecture of bacterial and eukaryotic cells. Current work focuses primarily on the sugar specificity and bacterial agglutinating property of a lectin from the leaves of *Madhuca neriifolia* (Moon) H.J. Lam. The study could precipitate lectin from the leaves at 80-100 percentage saturation of ammonium sulphate. Cation exchange chromatography with carboxy methyl cellulose resulted in 2 peaks and lectin activity was conferred to peak 1 as determined by haemagglutination assay. Haemagglutination potential of the lectin was inhibited by D-galactose, D(+) arabitol, N-acetyl-D-glucosamine and D(+) fucose with minimum inhibitory concentrations of 125±0 mM, 104.17±36.08 mM, 52.08±18.04 mM and 125±0 mM respectively. The lectin shows its agglutinating ability against Gram positive bacteria, *Enterococcus faecalis* and *Listeria monocytogenes* and the agglutination potential was inhibited by D-galactose, D(+) arabitol and D(+) fucose. It could also agglutinate the Gram negative *Pseudomonas aeruginosa* cells and the specific sugar involved in this binding was determined as N-acetyl D-glucosamine as evidenced by sugar inhibition assay. Among the agglutinated bacteria, only the Gram positive *E. faecalis* and *L. monocytogenes* were inhibited by the lectin with MIC_{50} values of 25µg and 38µg respectively.

Key words: Lectins, *Madhuca neriifolia,* Haemagglutination, Bacterial agglutination, Sugar inhibition, *Enterococcus, Listeria, Pseudomonas*

P-I.45: *IN-VITRO* EVALUATION OF *ZINGIBER OFFICINALE* ROOT EXTRACT AGAINST HUMAN OVARIAN CANCER

Swarnali Roy, Tamojit Santra, Moumita Shee, Tathagata Adhikary, Joydeep Ghosh, Piyali Basak*

Biomaterials, Microbiology and Cell culture laboratory, School of Bioscience and Engineering, Jadavpur University, Kolkata

E mail: swarnaliroy.rx@gmail.com

Ovarian cancer is reportedly the third most common form of gynaecological cancer accounting for over 2.5% of all female cancer incidences and 5% of cancer deaths in the United States with reportedly increasing incidences in developing countries such as India. Phytochemicals solely or in combination with conventional drug therapy promise to provide a more stable, efficient, safe and long term remedy towards such types of malignancies as compared to normally administered chemotherapeutic procedures. The Indian subcontinent is blessed with a large variety of flora which act as repositories for phytochemicals of immense medicinal value. In this study, we have used the roots of *Zingiber officinale* to prepare 60% methanolic extract to explore its diverse range of biological activities. The extract was analysed qualitatively and quantitatively to indentify the phytochemical groups. They were separated partially using column chromatography and TLC. The in-vitro antioxidant activity was determined using DPPH free radical scavenging activity assay. The in-vitro antimicrobial activity was determined against *E.coli* and *S.aureus* to estimate the respective minimum inhibitory concentration. Similarly, the in-vitro cytotoxicity was determined against OVCAR-3 cell line and compared with human peripheral blood mononuclear cells. The extract was found to be mostly growth inhibitory for ovarian cancer cell line with negligible cytotoxicity towards normal cells.

Keywords: *Zingiber officinale*, ovarian cancer, phytochemicals, antimicrobial, cytotoxicity.

P-I.46: ANTIOXIDANT ACTIVITY IN SELECTED VEGETABLES AND FRUITS

T G Thippeswamy, Ms. Ruksana and Ms. Zehra Khanum
Department of Studies and Research in Biochemistry, Tumkur University,
B H Road, Tumakuru, Karnataka state, India
E mail: thippeswamytg@gmail.com

Antioxidants play an important role as health protecting factor can prevent oxidative stress due to free radicals produced during oxidation of macromolecules. Antioxidants molecules are capable of inhibit the oxidation that reduces the risk of chronic diseases including cancer and heart disease. Recently naturally occurring antioxidants present in the fruits and vegetables showed effective free radical quenching. Therefore, the present investigation deals with the antioxidant activity in selected vegetables and fruits. Samples were collected from the city market of Tumkur district. Moisture and fat content by AOAC methods and Antioxidant activity and inhibition by DPPH method. The present research results showed that the percentage of moisture content in Cauliflower , 57.64; Cabbage, 23.07; Amla ,13.48; Apple 15.34; Drumstick leaves, 7.39 ; Orange, 13.60 ; Spinach, 19.64 . The percentage of dry matter content in Cauliflower, 42.36, Cabbage, 76.93 ; Amla 86.52; Apple, 84.66; Drumstick leaves, 92.61; Orange, 86.4 ; Spinach, 80.36. The present research investigation data showed IC_{50} value in Cauliflower, 226.53µg, Cabbage, 151.5 µg; Amla 110.33 µg; Apple, 166.14 µg; Drumstick leaves, 164.91 µg; Orange, 153.2 µg; Spinach, 140.34 µg. Antioxidant activity in selected vegetables and fruits were showed marginal amount of antioxidant activity in turn prevent or controls the chronic disorder including cancer and heart disease.

Key words: Antioxidant activity, Vegetables and Fruits

P-I.47: REMOVAL OF NICKEL FROM INDUSTRIAL WASTE, USING NANO SIZED ACTIVATED COCONUT SHELL

T.Sruthi[a], Meena Vangalapati*[b]

[a] Dept of Chemical Engineering, AUCE (A), Andhra University, A.P, India

*[*b] Dept of chemical Engineering, AUCE (A), Andhra University, A.P, India*

E mail: meena_sekhar09@yahoo.in

The hazardous release of toxic pollutants from industries has lead to severe destruction of nature. The various industries that release many toxic pollutants into the water bodies, soil and atmosphere cause adverse effects on the aquatic life, environment and human health. This paper focuses on reducing the nickel concentration in the waste effluent. The methodology involves the using of organic waste in various forms such as raw, activated and nano size powders. Immobilized beads are made and placed in a column where the nickel solution is passed through, thus removing excess concentrations of nickel. The industrial waste which consists of nickel was taken and the nickel solution was leached using sulfuric acid and hydrogen peroxide solutions. The nickel extract solution was then diluted for further treatment. Here we used the nano sized powders of coconut shell and dried algae for two different methods to treat nickel. These nano powders were converted in the form of beads. The beads were taken in a column in which the extract of nickel solution was present. The observations were noted every day. The estimations were done using colorimeter. It was observed that day by day the concentration of nickel was reducing. After 3 days the reduction efficiencies were calculated as 12% using coconut shell powder and 41.77% using dried algae powder. On 5th day the concentration of nickel was further decreased using coconut shell powder, but increased with algae powder. This shows the inactivity of algae powder after 4 days. But, the reduction efficiency using nano sized dried algae powder was more than the reduction efficiency using coconut shell powder. Therefore, the organic dried algae powder is better in treating or reducing the nickel concentration in the waste effluent when compared with coconut shell powder. Thus, the paper concentrates on the comparison of treating or reducing the concentrations of nickel in the waste effluent using beads made of nano sized powders of coconut shell and dried algae, in which algae powder got more reduction efficiency.

Keywords: nickel; nano sized; coconut shell powder; dried algae powder; reduction efficiency.

P-I.48: PERIODONTAL STEM CELL REGENERATION USING PLANT EXTRACTS

Sourabh Patil, Tanvi Kakade and Kalpana Chandramore*
Department of Biotechnology, Vidya Pratisthan's Arts, Science, Commerce College, Baramati, Dist- Pune 413133
**E mail: kalp.chandramore@gmail.com*

Periodontitis is a set of chronic inflammatory disease which causes the irreversible destruction of the tooth-supporting tissues. Periodontal regeneration is an intricate process as it invoves regeneration of three diverse and unique tissues such as cementum, PDL, and bone. It is also challenging to restore a triphasic interface between these different tissues. Till date, a range of surgical procedures, grafting materials, growth factors, and the barrier membranes have been used to repair the damage which occurs during periodontitis. However, all those procedure have several limitations to restore the complex physiology of tooth. Medicinal plants and herbs have always been valuable in disease treatment. A series of studies reveal that plant based bioactive compounds can stimulate proliferation and differentiation of stem cells.

In view of this, we have checked the effect of plant extracts as aloe vera and *Acacia* on dental pulp stem cells regeneration. Peiodntal stem cells are isolated and maintained *in vitro*. We could observe the remarkable increase in the rate of proliferation of cells. The present study aim to develop a convenient medicine to treat the Periodontitis related disease.

Keywords: Periodontitis, stem cells, Plant extracts

P-I.49: ENHANCEMENT OF HAEMOPOETIC ACTIVITY BY *PIPER BETLE* LEAF EXTRACT IN SWISS ALBINO MICE EXPOSED TO ELECTRON BEAM RADIATION

Roy U.B.[1], Vijayalaxmi K.K. [2] and Ganesh S.[3]
[1]Department of Zoology and Genetics, Government Science College, Bangalore
[2]Department of Applied Zoology, Mangalore University
[3]Microtron Centre, Mangalore University
E mail: royub09@gmail.com

The present study aimed at investigating the enhancement of haemopoetic activity of fractions of *Piper betle* leaf extract in radiation exposed Swiss albino mice. The animals were subjected to pretreatment with two doses of extract fractions, viz, 50 and 100 mg/kg body weight with ether (E50, E100) and methanol (E50, E100) fractions by administering through oral gavage before total body irradiation with 14 Gy electron beam radiation. The RBC and WBC counts in the E-beam-irradiated groups showed significant decrease in comparison with the control group. There were significant differences in RBC and WBC counts at first week as compared with weeks 2 and 4. In the pretreated group followed by irradiation, the RBC count increased significantly in comparison with the radiation alone group at each of the three time intervals. In addition, the total WBC count also increased significantly in the radio-protected groups in comparison with the radiation alone group at each of the three time intervals. There were significant differences between the RBC and WBC counts after the 4th week as compared with its level at the 1st week in the animals pretreated with the extract before irradiation.

Key words: electron beam radiation, *Piper betle,* irradiation, haemopoetic activity.

P-I.50: HLA-G POLYMORPHISM MEDIATES HNSCC RISK IN INDIAN POPULATION

Vertica Agnihotri a, Abhishek Gupta a, Sadanand Dwivedi b, Lalit Kumar c, Sharmistha Dey a,

Department of Biophysics a, Biostatisticsb and Medical Oncologyc All India Institute of Medical Sciences, Ansari Nagar, New Delhi, India
E-mail address: sharmistha_d@hotmail.com

Human leukocyte antigen-G (HLA-G) is an immuno-modulatory molecule exhibits tolerogenic functions by inhibiting immune-competent cells. HLA-Ggene has been identified as a disease-susceptibility locus in cancer genome-wide association studies. We conducted a genetic association study in North-Indian HNSCC patients (n=383) and controls (n=383) between two polymorphisms-***Del/Ins*** (rs371194629) and **+*3142G/C***(rs1063320) using DNA-PAGE and RFLP-PCR method. Logistic regression analysis indicated that heterozygote and homozygote 14-bp*Ins/Ins* genotype confer a lower risk (aOR=1.71, OR=1.81,respectively).*C/C* genotype (aOR=1.93),"*C"*allele were more pronounced in patients. Both variants (*Del/Ins-Ins/Ins,G/C-C/C*) were shown to have a significant risk(OR=2.78)*vs* one variant(*Del/Del-G/C,Del/Del-C/C,Ins/Ins-G/G*)."*C"*allele was associated with tumor-stageIV. Both polymorphisms showed positive correlation with tobacco (OR=1.91).Therefore, HLA-G polymorphisms may be essential for carcinogenesis of HNSCC.

Keywords: HNSCC, HLA-G polymorphism, *14bp Del/Ins, G/C* SNP, North-Indian Population.

P-I.51: *IN VITRO* AND *IN SILICO* EVALUATION OF *EMBLICA OFFICINALIS* FRUIT EXTRACT AND ITS GREEN-SYNTHESIZED SILVER NANOPARTICLES AS NOVEL ANTIMICROBIAL AND ANTICANCER AGENTS

Tamojit Santra, Pratik Das, Shreya Biswas, Samrat Paul, Piyali Basak*
Biomaterials, Cell culture and Microbiology Lab, School of Bioscience and Engineering, Jadavpur University, Kolkata
E mail: santra.tamojit0@gmail.com

The fruits of *Emblica officinalis* have been reported to contain several phytochemicals some of which have shown promising *in vitro* antitumor activity. A different generation of nanoparticle based research is quickly setting up itself as one of the stalwarts in the diverse sectors of biotechnology and biomedical engineering particularly in the therapeutic segment. The present examination was pointed towards researching the *in vitro* antimicrobial and anticancer activities of biologically orchestrated silver nanoparticles (AgNPs) from the aqueous fruit concentrate of *E. officinalis* commonly known as amla, and correlating with the original extract. Qualitative and quantitative phytochemical analyses were performed to detect and quantitate the presence of different groups of phytochemicals present in the extract. The morphology and physiology of the synthesized nanoparticles were studied primarily through UV-Vis spectroscopy, FTIR, DLS-zeta and SEM and TEM analyses. The synthesized nanoparticles were found to be largely stable in solution, monodisperse and mostly spherical having an average particle size of 80 nm. *E. coli* and *S. aureus* were used for evaluating the *in vitro* antimicrobial activity thus to determine the minimum inhibitory concentration against each microbe. The *in vitro* antioxidant activity was determined through the DPPH free radical scavenging activity assay. The *in vitro* cytotoxicity assay was performed against MCF-7 cell line and compared with that of human peripheral blood mononuclear cells (PBMCs) through MTT assay. It was observed that the extract was selectively cytotoxic towards breast cancer cell line with negligible cytotoxicity towards normal cells. Our virtual molecular docking study suggests that bioactive compounds like Emblicanin A, B,

Pedunculagin, Punigluconin etc., the presence of which have been reported in the fruits of *E. officinalis* have a greater binding affinity toward estrogen alpha receptor (1ERE) as compared to standard drug tamoxifen. The different physiochemical and pharmacokinetic properties of the different ligands were also predicted through the SwissADME web based software tool. A broad range study needs to be initiated towards exploring the potential of such nanomaterials as novel anticancer agents, which might emerge as better alternatives to conventional chemotherapeutic agents.

Keywords: *Emblica officinalis*, molecular docking, 1ERE, silver nanoparticle, antimicrobial, anticancer.

P-I.52: PARTIAL PURIFICATION AND CHARACTERIZATION OF FIBRINO (GENO) LYTIC AND ANTICOAGULANT SERINE PROTEASE FROM *TRIDAX PROCUMBENS* EXTRACT

Vinod Gubbiveeranna, C. G. Kusuma, C. K. Sumachirayu, S. Bhavana, S. Nagaraju*
Department of Studies and Research in Biochemistry, Tumkur University, Tumkur – 572 103
Email: nagarajubiochem@gmail.com; nagaraju@tumkuruniversity.ac.in

Tridax procumbens is a perennial plant native to tropical America distributed in tropical Africa, Australia and Asia. It is widely used in folk/tribal medicinal practice to arrest bleeding from minor injuries and to enhance wound healing process. The plant extracts have shown antioxidant, anti-microbial, anti-inflammatory and vasorelaxant properties.

Earlier we have identified and evaluated *T. procumbens* extract for protease involved in blood coagulation cascade. Here we are reporting partial purification and characterization of serine protease from the extract. In this study, the partially purified protease was evaluated and studied for its effect on fibrinogen, fibrin, in blood coagulation cascade and platelet aggregation.

Tridax procumbens extract was fractionated on Sephadex G-75 column and protease fractions were concentrated. SDS-PAGE pattern of the partially purified protease showed protein bands and gelatinolytic activity in zymogram assay with translucent activity bands in high molecular weight region.

The partially purified protease showed fibrinogenolytic activity in a concentration dependent manner. It also showed fibrinolytic activity by completely degrading cross-linked human fibrin clot prepared from human plasma.

In blood coagulation studies upon incubation with plasma, the partially purified protease increased the APTT from 64 sec to 320 sec at a concentration of 40 µg indicating its involvement in the intrinsic pathway. In RT the clotting time was increased from 187 sec to 550 sec at a concentration of 15 µg. This suggests the anti-coagulant property of serine protease.

In conclusion, the partially purified serine protease is a potent anti-coagulant associated with fibrino(geno)lytic and anti-platelet aggregation property.

P-I.53: STUDY ON SECONDARY METABOLITES OF MARINE-DERIVED FUNGUS *ASPERGILLUS INTERMEDIUS* (MK680137)

Neha Keral* and M.S. Manmohan
Department of Life Science, Bangalore University, Bengaluru –560 056 (Karnataka), India
E mail: nehakeral.micro88@gmail.com

Marine microorganisms comprise an important group of natural product producers having diverse properties. The aim of the present study was to isolate and identify marine derived fungi *Aspergillus intermedius*. The secondary metabolites were extracted using Ethyl Acetate (EtOAc). The extract was screened against important human pathogens. The mycochemical analysis showed the presence of alkaloids, phenolics, flavonoids and terpenes. HPLC showed *A. intermedius* contain 0.418 mg of alkaloids, 0.1706 mg of phenolics, 0.1397 mg of flavonoid and 2.179 mg of terpenes per 10 mg. Further, isolation and characterization of the active compounds will explore the discovery of new marine natural products.

Keywords: Marine fungi, *Aspergillus intermedius*, Mycochemical analysis, Antimicrobial activity, HPLC

P-I.54: METHICILLIN RESISTANT STAPHYLOCOCCUS IN HEALTHCARE SETUP: A REAL SCARE

Anita Nandi[1], Srijan Das[2]
[1]Department of Microbiology, Medical College and Hospital, Kolkata 700-073, West Bengal, India
[2]Medical College and Hospital, Kolkata 700-073, West Bengal, India
Email- anitanandi20121964@gmail.com

Staphylococcus aureus is notorious for developing resistance against various antimicrobials. The objective of our study was to identify and genotypically characterize isolates of *Staphylococcus aureus* in clinical samples in a tertiary care hospital to get an idea about the growing methicillin resistance. A total 2349 non-repetitive, consecutive isolates were collected from different clinical samples over a period of six months. Phenotypic identification was done using Cephoxitin disc followed by a confirmation by Vitek 2 automation method. 34.89% of all isolates were phenotypically identified as MRSA. Genotypic identification demonstrated presence of mecA gene in the isolates. Our study revealed that prevalence of MRSA (34.89%) was quite high in our healthcare set up and has been growing over the years.

Key Words: Phenotypic, Genotypic, MRSA, mecA

P-I.55: ANTIMICROBIAL ACTIVITY OF NOVEL SYNTHETIC RUTHENIUM COMPOUNDS

Anjoom Nikhat[1]*, Medha Basu[1], Suhana Sultana[1], Mayukh Bhattacharyya[1], Ritabrata Biswas[1], Sanjib Ganguly[2], Arup Kumar Mitra[1]

[1]: PG Department of Microbiology, St. Xavier's College (Autonomous),

[2]: PG Department of Chemistry, St. Xavier's College (Autonomous),

30, Mother Teresa Sarani, Kolkata- 700 016, West Bengal, India

**Corresponding author's E-mail: anjoom.nikhat.30@gmail.com*

Antibacterial and antifungal assays were performed to screen the potential of some novel ruthenium compounds having pyrene conjugate. A notable observation is that the ruthenium complex conjugated with the ligand has a mild inhibitory activity on *Malassezia* spp. (zone of inhibition of 11mm ±0.15) which may be used in synergism with a stronger ligand to develop a novel antifungal agent. The antimicrobial activity of the conjugated complex is noteworthy against the Gram-positive bacteria (*Bacillus subtilis, Bacillus megaterium, Staphylococcus* spp. and *Streptococcus* spp. with zone of inhibition of 34 mm ±0.25, 23 mm ±0.15, 4 mm ±0.01 and 25 mm ±0.40 respectively) and even more in the case of Gram-negative bacteria (*Klebsiella* spp., *Pseudomonas* spp., *E. coli* and *Enterococccus* spp. with zone of inhibition of 39 mm ±0.30, 32 mm ±0.04, 13 mm ±0.01 and 3 mm ±0.01 respectively). Propidium iodide staining and fluorescence microscopy reveals effect of the ruthenium compound on the outer membrane of the bacteria as well as on the bacterial motility. Protein leakage study results indicate susceptibility of *Klebsiella* cells to ruthenium compounds (0.069mg/ ml of protein content was detected) which further leads to a probable mode of action of these compounds wherein they not only cause damage to the bacterial membrane but also cause protein leakage from the cells. The present study clearly upholds the potential antimicrobial activity of this transition metal complex and emphasizes the importance of these ruthenium compounds with pyrene conjugate in developing efficient antimicrobial agents in the future.

Keywords: Ruthenium, antimicrobial, propidium iodide, membrane damage, protein leakage

P-I.56: ISOLATION AND IDENTIFICATION OF ENDOPHYTIC BACTERIA FROM DAY FLOWER OF *COMMELLINA BENGHALENSIS*

Archana S. Injal[1], Tejaswini C. Mendke[2], Tara N. Matnale[3] and Somnath Kshirsagar[4]
[1]Department of Genetics, [2]Department of Nanotechnology, [3]Department of Biotechnology, Walchand college Of Art and Science, Solapur
[4] Department of Zoology, K.N. Bhise College of Arts and Science, Kurduwadi
E mail: tejaswini.mendke@gmail.com

A recent trend in the medical field is use of weed plant to produce the medicines. So the present study reveles the use of one of weed that is *Commellina benghalensis.* It belongs to family *commelinaceae*, which is widely distributed in India. Many of literature study states that there were no any sub - stantial work was carried out, on endophytic bacteria present in this plant species. Endophytes are nothing but microflora of plant. Each plant has its own endophytic flora. , but they do not cause any disease, are called endophytes. So, the efforts were made to investigate the isolation and characterization of endophytic bacteria present in dayflower of *Commelina benghalensis.* The endophytic analysis shows presence of *micrococcus species* in day flower of this plant.

Key words: *Commellina benghalensis,* Dayflower, endophytic bacteria, *micrococcus species*

P-I.57: CYTOTOXIC AND APOPTOTIC STUDIES OF BIOSYNTHESIZED ZINC OXIDE NANOPARTICLES EXTRACTED FROM THE *CALOTROPIS GIGANTEA*

Arshika Srivastava[1], Sankranthi Sumhitha, Sweta Kumari, and S. Rajashekara[*, 2],
Centre for Applied Genetics, Department of Studies in Zoology,
Bangalore University, Jnana Bharathi Campus,
Off Mysuru Road, Bengaluru 560 056, India
[1]E-mail: shrivastavaarshika@gmail.com;
[*, 2]For correspondence E-mail: rajachandra3908@yahoo.co.in

Biosynthesis of Zinc oxide nanoparticles (ZnONPs) synthesis using plants is an alternative to conventional physio-chemical methods due to its simplicity, eco-friendliness and extensive antimicrobial activity. In accordance with the green chemistry principles, the use of plant extracts as reagent for nanoparticle synthesis has been highlighted. In present work, biosynthesis of ZnONPs from the methanolic leaf extracts of *Calotropis gigantea* L. using zinc nitrate hexahydrate solution as a precursor was experimented for its cytotoxic and apoptotic activity on the MDAMB-231 cell lines obtained from the stock cells-ATCC. Apoptotic analysis was done by treating the cells suspended in RPMI medium by 80 and 160 µg/ml of ZnONPs samples and then with Annexin V to induce apoptosis. The treatment of cells at the concentrations of 80µg/ml and 160µg/mL of ZnONPs had shown G_2M arrest from 9.09% (Control) to 11.91% and 7.56% respectively. S phase arrest was found to be 11.17% and 27.21% at concentrations 80µg/mL and 160µg/mL of ZnONPs respectively in MDAMB-231 cells. The increase in cell death with an increase in the concentration of nanoparticles signifies that the ZnONPs was effective. The samples of ZnONPs showed IC_{50} value of 139.4 µg/ml. The 80 µg/ml and 160 µg/ml treatment of ZnONPs samples had induced early and late apoptosis in MDAMB-231 with 8.17 %, 5.98 % and 20.36 %, 23.36 % apoptotic cells respectively. The biosynthesized ZnONPs can potentially alter the apoptotic protein expression and trigger apoptosis in MDAMB-231 cells. The elucidation of ZnONPs applications leading to metal ion reduction in the different classes of human

breast cancer cell lines is necessary to develop a rational nanoparticle synthesis procedure. Nanotechnological techniques can potentially be used to improve the cytotoxic properties and to control their apoptotic expression. An extension of the procedures to enable reliable synthesis of nanoparticles could increase their efficiency of these cell lines.

Keywords: Apoptotic, Cytotoxic, Green chemistry, Zinc oxide nanoparticles

P-I.58: ORALLY ADMINISTERED DICLOFENAC ALONE AND DICLOFENAC-BETAINE MIXTURE ON RATS: EFFECT ON HISTOPATHOLOGICAL CHANGES IN RENAL TISSUES

Mohd. Basheeruddin[1] and Shazia Jamal[1*]
School of Life Sciences, B.S. Abdur Rahman Crescent institute of Science & Technology, Vandalur, Chennai-48
E mail: mohdbasheeruddin_sls_phd_2014@crescent.education

The diclofenac concentration in many organism is organism is sufficiently high to destabilize (inhibit) many proteins, yet organism survive and function. The generally accepted explanation is the counteracting hypothesis, which holds that betaine stabilize proteins and oppose the deleterious effect of diclofenac. The one Osmolytes are typically found at 2M concentration stabilize the all three model proteins [Ribonuclease-A (RNase-A). Lysozyme and á-lactalbumin (á-LA) more in the presence of different concentration of diclofenac under physiological conditions in in-vitro study. Does this means that this osmolyte holds for all proteins in-vivo study too? The present study was carried out to evaluate the adverse effects of diclofenac sodium in wistar albino rats at same doses on some hematological and biochemical parameters and to tests the counteracting hypothesis by determining the effects of diclofenac sodium in combination with betaine (osmolyte) at a dose of 20 mg/ kg and 30 mg/ kgb.wt. once/day orally, respectively. The obtained results showed that, diclofenac sodium at dose of 20 mg/ kg b.wt. induced a significant decrease in Hb, RBCs and WBCs values. Moreover there were significant decrease in serum decrease in Hb, RBCs and WBCs values. Moreover there were a significant decrease in serum total protein and significant increase in aminotranseferases, urea and creatinine levels. In addition there is a significant increase in urea creatinine, bilirubin and urobilinogen levels. Histopathological alterations were found in livers, lungs and kidneys. We show here diclofenac sodium at dose of 20 / kg b.wt. induced non-significant changes and the combination of diclofenac with betaine compensate the adverse effect in the previous parameters. It could be concluded that administration of diclofenac sodium at high dose induced some adverse effects and the

combination of diclofenac with betaine induced compensation effect on hematological and biochemical as well as histology of liver, lungs and kidney. That could be attributed to oxidative stress induced by the drug. However, we can conclude that diclofenac effects are reversible.

Key words: Diclofenac Sodium, RNase-A, Lysozyme, á-LA, Betaine, Liver, Lungs, Kidney, Histopathology

P-I.59: THE IMPACT OF PHOTODYNAMIC THERAPHY AND SANITATION IN FOOD

Bashir Ahmad Aliyu
Department Of Microbiology, Lovely Professional University, Phagwara, Punjab
E mail: bashirtiga@gmail.com

Photodynamic therapy (PDT) and sanitation is a novel and promising technology that aimed for surface cleaning and sanitation in food industry. It is based on the treatment of surfaces with nontoxic dyes (photosensitizers), followed by cleaning the surface with regular white light. The method is currently used in the medical field, food industry and was proved to have wide specificity against a variety of bacterial and viral pathogens as well as against yeasts and protozoa and development of resistance of microorganisms. Previous research highlight that the Photodynamic therapy (PDT) in medical field is a non-invasive, highly selective method for the destruction of unwanted cells and tissues. The Antimicrobial/antiviral PDT has been successfully used for the treatment of viral infections against antibiotic-resistant, bacterial and fungal strains.

Key words: photodynamic therapy, sanitation, Photosensitizer

P-I.60: OVERVIEW ON EPIDEMIC POTENTIAL OF RECENT EMERGING VIRAL INFECTIOUS DISEASES

H.Bharath Raj[1], T. Mohammad Munawar[2] and D.V Surya Prakash[3]
[1]Department of Biotechnology, JNTU Kakinada, Andhrapradesh
[2]Department of Biological and Chemical Engineering, Mekelle Institute of Technology, Mekelle University, Ethiopia
[3]Department of Biotechnology, Meerut Institute of Engineering and Technology (MIET), Meerut-250005, India
Email: bharathraj1406@gmail.com

Virus is the tiny organism that causes infections in human body. It exists almost everywhere. Many types of viruses that cause various infection diseases. Especially Ebola virus, Zika virus and Swine influenza virus are recent emerging viral infectious disease running in the world. The spreading of diseases mainly through the transmission of blood and body fluids from one to other person due to inadequate hygienic procedures. These viral infections can cause a systemic inflammatory response and immune suppression finally that leads to body organs failure due to the damage of the blood vascular systems immune systems. According to the World Health Organization, Extensive research investigations are needed to develop vaccines and drugs for the treatment of above viral infection diseases.

Keywords: Virus, Vaccine, Swine flu virus, Zika Virus, Ebola Virus.

P-I.61: EXPLORATION OF *PSEUDOMONAS STUTZERI* BACTERIAL STRAIN FOR PRODUCTION OF THERAPEUTIC ENZYMES

Bhawana Kharayat[1], Himani Hooda[1], Priyanka Singh[*], Surabhi Bajpai
Department of Bioscience and Biotechnology, BanasthaliVidyapith, Rajasthan, India
E Mail: priyay20@gmail.com

Pseudomonas stutzeri has been explored as new novel bacterial strain for producing different biomolecules. We have studied the production of anticancer L-methioninase and quercitin for diabetic wound healing for pharmaceutical sectors. These biomolecules were produced intracellularly by *Pseudomonas stutzeri* MTCC 101.L-methioninase was purified with specific activity122.89 U/mg and purification fold 2.68 after using DEAE-Celluose chromatography. Enzyme show stability at pH 7.5 and temperature 37ÚC and shows low value of Km (79.52 mM) and value of Vmax (140.84µmole/min/mg).Quercetin acts as bioflavonoid used for treating various diseases. The drug delivery system of quercetin biomolecules is limited by its poor water solubility, absorption, and permeability.

Key words: L-methioninase, Quericitin, Production, Purification

P-I.61: THROMBIN- AND PLASMIN-LIKE AND PLATELET AGGREGATION-INDUCING ACTIVITIES OF CYSTEINE PROTEASE FROM *PLUMERIA ALBA* L. LATEX

CG Kusuma[a], Vinod Gubbiveeranna[a], CK Sumachirayu[a], S Bhavana [a], H Ravikumar[b], S Nagaraju*[a]

[a]Department of Studies and Research in Biochemistry, Tumkur University, Tumkur, Karnataka, India

[b]Department of Biological Sciences, Jnanabharathi Campus, Bangalore University, Bangalore, Karnataka, India

Email: nagarajubiochem@gmail.com

This study aimed to study the role of *P. alba* L. latex (PaNL) in hemostasis and platelet aggregation. The findings of casein/gelatin zymography confirmed that PaNL possesses protease activity belonging to cysteine-type of protease. PaNL hydrolyzed the subunits of fibrinogen, fibrin, and collagen types I and IV. Its fibrin-degradation activity indicated that PaNL possesses plasmin-like activity. Further confirmed by the results of the fibrinogen-clotting assay PaNL induced platelet aggregation in the absence of agonists. PaNL possesses procoagulant, fibrino(geno)lytic, thrombin- and plasmin-like activities and induces platelet aggregation, which could explain its usage for wound treatment in folk medicine.

Keywords: *Plumeria alba L.* latex, Fibrinogenolytic, Procoagulant, Platelet aggregation, Thrombin-like enzyme, Plasmin-like enzyme

P-I.62: UNDERSTANDING THE ROLE OF MYCOBACTERIA UPREGULATED CISH IN DAMPENING IFNÃ SIGNALING DURING MYCOBACTERIAL PATHOGENESIS

Debika Ghatak, Tanmay Verma and Somdeb Bose Dasgupta*
Molecular Immunology and Cellular Microbiology Laboratory
Department of Biotechnology, Indian institute of Technology Kharagpur
E mail: debikaghatak@gmail.com

Mycobacterium tuberculosis causing TB is adept at subverting host immune response. Mycobacteria overexpress SOCS1 and CISH proteins to dampen pro-inflammatory IFNg downstream signaling. Although SOCS1's role has been studied the role of CISH in the process remains an enigma. Through *in silico* docking studies we identified CISH to interact with IFNgR2. Presently by purifying these proteins or expressing them in macrophages we sought to analyse their interaction in vitro and in vivo. We hypothesis that, SH2 domain of CISH interacts with IFNgR2 to prevent receptor dimerization and hinder downstream signaling. Our pursuit would be to execute on these lines.

P-I.63: PREVALENCE OF ESCHERICHIA COLI IN URINARY TRACT INFECTION AND ITS ANTIBIOGRAM PATTERN

Deena T David

Department Of Zoology, St.Albert's College (Autonomous), Ernakulam (Affiliated to Mahatma Gandhi University, Kottayam)

E mail: tdaviddeen@gmail.com

Urinary tract infection (UTI) is one of the most common microbial infections affecting all age groups across the lifespan. The aim and objectives of this study was to gain knowledge about the type of pathogens causing Urinary Tract Infection and to determine their antibiotic sensitivity pattern. UTI has become difficult to treat due to appearance of pathogens with increasing resistance to antimicrobial agents. This study was carried out on clinically suspected UTI patient in a few hospitals around Ernakulam. From total 15 urine samples, pathogens were isolated and identified and their antibiotic susceptibility was studied by Kirby Bauer's method. From the urine samples of patients tested positive for urinary tract infection, culture of gram negative bacteria was isolated. The identification of these bacteria was done based on microscopic, cultural and biochemical characteristics. The most predominant was the *Escherichia coli* (40%) followed by *Klebsiella pneumonia* (26.6%), *Proteus mirabilis* (6.6%) *and Pseudomonas aeruginosa* (6.6%) and others (20%). The most frequent etiological agent of UTI *Escherichia coli* was highest among the isolates. *Escherichia coli* was selected, and identified. *E.coli* strains showed specific morphological, cultural and biochemical characteristic of *E.coli*. *Escherichia coli* were resistant to 8 antibiotics and more sensitive to Tetracycline and Chloramphenicol. Bacterial identification was done using biochemical and molecular methods. Molecular techniques like PCR and BLAST results helped for confirmation of *Escherichia coli*. This study showed that pathogens responsible for UTI showed increasing resistance to the commonly prescribed drugs. This study will guide physicians in making right choice of drugs thus ensuring effective and quick treatment of the infection and preventing drug resistance.

P-I.64: STUDIES ON LANTIBIOTICS: A CLASS OF BACTERIOCINS PRODUCED BY PROBIOTIC LACTIC ACID BACTERIA ISOLATED FROM INFANT FAECAL MATTER

Devaranjan Das, Smita Hasini Panda* and Nakulananda mohanty
P.G. Department of Zoology, North Orissa University, Sriramchandra Vihar, Takatpur,Baripada, Mayurbhanj, Odisha, india -757003
Email: dasdevranjan88@gmail.com

Probiotics lactic acid bacteria are good bacteria that improve the digestive system and also control the growth of harmful bacteria. The lactic acid bacteria were isolated from fecal matters of infant (10 days – 6 months old) collected from different hospitals in odisha. The isolated Strain showed high homology with *Bacillus subtilis* using 16s rRNa sequencing. The newly *Bacillus subtilis* Strain MK453362 are showing the Lantibiotic type of bacteriocins (Class-1). Lantibiotics are classes of bacteriocins produced by gram positive bacteria. The homology modeling structure was performed by Swiss model database. Due to their unique properties, lantibiotics types of bacteriocins have recently attracted significant attention as new antimicrobial agent to combat infectious disease.

Keywords: *Bacillus subtilis*, Probiotics, Lantibiotics, Bacteriocins, Molecular Structure

P-I.65: ISOLATION OF DIESEL DEGRADING BACTERIA FROM CHILIKA LAKE

Dibya Ranjan Das[1], Dhanesh Kumar[2], Shubhashree Mahalik[1*]

[1]*P.G. Dept. of Biosciences & Biotechnology, Fakir Mohan University, Balasore-756020, Odisha, India*

[2]*School of Life Sciences, Hyderabad Central University, Prof C. R. Rao Road, P.O. Central University, Gachibowli, Hyderabad, Telangana 500046, India*

Email of corresponding author: shubhashreemahalik@gmail.com

Chilika lake of Odisha is the largest brackish water lagoon of India which is famous for tourism as well as aquaculture. Extensive boating and use of fishing trawlers many a times lead to leak and accidental spill of diesel causing severe pollution and disturbance of aquatic life. A major area of research is the microbial degradation of diesel and other petroleum products, which requires the knowledge of microbial ecology of the diesel contaminated area. The sediments of Chilika are well suitable samples for isolation of diesel degrading bacteria. In this context, sediments collected from several sites of Chilika Lake were enriched in different minimal media (Biebl Pfennig, BG-11 etc.) supplemented with diesel to screen diesel-degrading bacteria. Pure cultures were obtained from samples growing in higher concentration of diesel (20%). Their growth rates were calculated and biochemical characterizations were done. The hydrophobicity index revealed a positive correlation with increasing diesel concentration, which is an indication of their ability to degrade diesel. In this study two diesel-degrading bacteria were isolated and identified by 16S rRNA sequencing. The identified strains were *Paenibacillus* sp. and *Enterobacter* sp. Further studies are under process to characterize these bacteria.

Keywords: Diesel, Chilika, tolerance, *Paenibacillus*, *Enterobacter*

P-I.66: DESIGN AND SYNTHESIS OF A SURFACE FUNCTIONALIZED, PRO-DRUG CONSTITUTED, IMMUNOMODULATORY DRUG ENCAPSULATED NANOCAPSULE FOR HOST-DIRECTED THERAPY AGAINST TUBERCULOSIS

Homagni Dey*, Debika Ghatak* and Somdeb Bose Dasgupta
Molecular Immunology and Cellular Microbiology Laboratory
Department of Biotechnology, Indian institute of Technology Kharagpur
E mail: homagni0610@gmail.com

Unregulated drug use and uncontrolled trails for anti-mycobacterials has led to extreme drug resistance in tuberculosis. Host-directed therapeutics are emerging as alternative strategies with a holistic approach to eliminate the pathogen. With such an aim we are synthesizing a mcyobacteria secreted virulence factor PknG targeting drug sclerotiorin (Sct) linked to OEG functionalized with mannose to form a nanocapsule which later would be encapsulated with ArginaseI targeting immunomodulatoru drug nor-NOHA. These nor-NOHA loaded mannosylated-OEG-di SCT nanocapsules would be characterized and tested for their efficacy in reeabling the infected macrophages to kill the mycobacteria within.

P-I.67: DATASET OF INTEGRATED PHYSICO-CHEMICAL PROPERTIES AND ISOLATION OF METAL RESISTANT BACTERIAL POPULATION FROM THE PENNA RIVER, CHENNUR MANDAL, KADAPA DISTRICT, ANDHRA PRADESH

M. Madakka[1*]
**Department of Biotechnology and Bioinformatics,*
Yogi Vemana Unniversity, KADAPA-516 005 (A.P), INDIA
E-mail: madakka@gmail.com

Penna River is the holy river of the state of Andhra Pradesh. A study was considered for the development of water quality index and isolation of microbes from this water samples. The present works purpose is to analyze the physico-chemical parameters and isolation of metal resistant bacteria from sediment of the penna river. The development of water quality index was monitored with parameters includes p^H, Temperature, Electronic Conductivity, Alkalinity, Total dissolved solids (TDS), Salinity, Total Hardness, Calcium and Magnesium Hardness, Chlorides, Fluorides, Sulphates , Phosphates, Nitrates , Biological Oxygen Demand (BOD), COD. In this study, sediment samples were tested to isolation of metal resistant bacteria by using serial dilution method, staining &bio-chemical tests. Respectively, MIC and Antibiotic resistance was carried out by Well diffusion method, Disc diffusion method. Heavy metals which are present in the water samples were analysed by Inductively Coupled Plasma Spectroscopy (ICP/OES). The obtained results showed that the average values of Lead in water samples were more than the normal drinking water.

Key words: Physico chemical parameters, Penna River, heavy metals, metal resistant bacteria

P-I.68: ENVIRONMENTAL ISOLATION OF CRYPTOCOCCUS NEOFORMANS BY SWABBNG TECHNIQUE FROM DECAYED WOOD TRUNK OF LIVING IN BETUL

Mahendra Nawange[1,2,3], Alka Pandey[1] Anil Prakash[2] S.R. Nawange[3], Jitendra Nawange[1,3] Maanyata Tiwari[3]

[1]Department of Microbiology J.H. GOVT. P.G. College, Betul (M.P.) India
[2]Department of Microbiology Barkatullah Vishwavidalaya Bhopal (M.P.) India
[3]Fungal Disease Diagnositc and Research Center, Jabalpur, (M.P.) India
Email: nawange1990@gmail.com

The aim of this study is to report regional prevalence of *Cryptococcus* neoformans in decayed wood inside trunk hollows of defriend living trees. Ten tree species were investigated in Betul City. Fifty five wood samples were collected and processed by swabbing technique, 24 were found to contain strains of *Cryptococcus.* The numbers of trees positive for *Cryptococcus neoformans* were 16 (76.19%), the highest CGU (3.4×10^4) was found in *Buteamonosperma* and lowest CFU (1.1×10^4) was found in *N. oleander* Among our samples, nine tree species, viz., *Ficusbenghalensis, Mangifera indica, Azadirachta indica, Saracaasoca, Tectonagrandis, Delonixregia, Nerium syzygiumcumini, Tectonagrandis,* and *Citrus aurantifolia* were recorded as the host for *Cryptococcus neoformans* for the second time in Central India. The data on high prevalence fungal population density colonization and available isolations indicate that roted wood in trunk hollow of living tree is a habitat for *C. neoformans.* Attention is drawn to the likely health hazard posed by the environmental reservoir of *C. neoformans* occurring in tree trunk hollows in proximity to human and animal habitations.

Key words: *C. neoformans*, Decaying wood, Betul, Swabbing technique

P-I.69: HRM BASED GENOTYPING OF HEPATITIS B VIRUS (HBV)

Manash Jyoti Kalita and Subhash Medhi
Dept. of Bioengineering & Technology, Gauhati University, Guwahati-14
E mail: mjkalita0109@rediffmail.com

The worldwide prevalence of HBV is about 3.9% (Global prevalence, treatment and Prevention of hepatitis B virus infection in 2016: a modelling study; The Lancet Gastroenterology & Hepatology; Vol 3, issue 6, P383-403, June 01 2018). As per WHO report 2017; Hepatitis B prevalence is highest in the WHO Western Pacific Region and the WHO African Region, where 6.2% and 6.1% of the adult population is infected respectively. In the WHO Eastern Mediterranean Region, the WHO South-East Asia Region and the WHO European Region, an estimated 3.3%, 2.0% and 1.6% of the general population is infected, respectively. And in the WHO Region of the Americas, 0.7% of the population is infected. The disease progression and severity along with severe to cure condition is solely co related with the viral genotype. Genotypic difference as well as sub genomic difference plays a crucial role in treatment response. This study focuses on genotyping based on genome heterogeneity using HRM technique.

A total of 20 HBsAg positive samples were collected from Medicine OPD of GMCH, Guwahati. The samples were than extracted for HBV DNA using viral nucleic acid extraction kit (geneaid) and then subjected to nested PCR amplification for HBV Pre S region. The amplified products were divided into two groups. One group was used for Sanger Sequencing and the other group for HRM analysis using Type-it HRM PCR kit(QIAGEN) using Rotor Gene Q (QIAGEN) machine.

Sanger sequencing data analysis shows 12 samples of HBV genotype D (Genotype D2- 9 no; Genotype D4- 3 no) 2 samples of HBV Genotype C (Genotype C2- 1 no; Genotype C3- 1 no) and the other 2 samples of HBV Genotype A. The HRM melt curve analysis data for the same samples shows significant difference in Tm for the genotype D, C and A of HBV.

The result obtained shows that HRM technique can successfully discriminate between the tested genotypes of HBV. Thus it can be used as a genotyping technique for HBV.

Although Sanger sequencing and NGS is there for sequence based genotyping, but these technique involves higher operation cost and expertise to perform. Whereas HRM based genotyping is quite easy, inexpensive and accurate as well.

Key words: HRM Technology, Hepatitis B Virus, Genotyping

P-I.70: EVALUATION OF CYTOTOXICITY OF GOLD NANOPARTICLES SYNTHESIZED USING NITRATE REDUCTAS ENZYME FROM *B.SUBTILIS*

Mehavish Fatima [1] and Aniroodha V. Pethkar [2]*

[1]*Maulana Azad College of Arts, Science and Commerce,*
Dr.RafiqZakaria Campus, Aurangabad (Maharashtra), Pin: 431001
[2]*Govt. Institute of Science, Nipatniranjan nagar, Caves Road, Aurangabad*
(Maharashtra), Pin: 431004
**Corresponding author e-mail:avpethkar@yahoo.com*

Living organisms, especially micro-organisms have a remarkable ability to form exquisite inorganic structures often in nanodimensions called the nanoparticles using soil isolate *Bacillus subtilis*. NADPH-dependent nitrate reductase enzyme converts Au^{3+}ions into Au^{0} that act as a nucleation sites for attachment of more Au^{3+}ions that are subsequently reduced to form tiny crystallites of gold nanoparticles Molecular docking studies were carried out to investigate the interaction of gold ions with the nitrate reductase enzyme Due to concerns regarding possibility of health hazards associated with nanoparticles, it was felt necessary to evaluate the toxicity of laboratory synthesised gold nanoparticles. It was found that the viability of cells exposed to gold nanoparticles (84.22%) was similar to that of the unexposed cells (86.87%). The results pointed to the non-toxic nature of biogenic gold nanoparticles

Keywords: Gold nanoparticles, bacteria, biogenic, nitrate reductase enzyme, cytotoxicity

P-I.71: PHYTOCOMPOUNDS (MYRICITRIN, VITEXIN AND VANILLIN) AUGMENTED LEUKEMIC CELL DEATH THROUGH OXIDATIVE STRESS

Monaj Kumar Sarkar[a], Santanu Kar Mahapatra[b] & Vellingiri Vadivel[a,*]
[a]Chemical Biology Lab (ASK-II-409), [b]Medicinal Chemistry and Immunology Lab (ASK-II-406), School of Chemical and Biotechnology (SCBT), SASTRA Deemed To Be University, Thanjavur, Tamil Nadu, India-613401
**Corresponding author's E-mail: vadivel@carism.sastra.edu*

In the present work we proved anti-leukemic potential of the myricitrin, vitexin and vanillin to find out safe alternative of available treatment. Phytochemicals exhibited dose-dependent (IC-50: 164.4, 147 & 29.22 µg/ml) and time-dependent cytotoxicity against HL-60, K562 and Jurkat. Phytocompound caused apoptosis by inducing free radicals such as ROS (1.33–2.65 AU) and NO (11.17-18.53 µM), membrane damage (AO/EB staining) and nuclear condensation (DAPI staining) which increased release of LDH (1326 – 1439 U/L), improved lipid peroxidation (10.19–14.41 nM/mg protein) and reduced SOD level (6.2–9.21 U/mg protein). Therefore the phyto-compounds could be developed as natural drugs for treating leukemia.

Key words: Myricitrin; Vitexin; Vanillin; Leukemia

P-I.72: EVALUATION OF SODIUM ALGINATE -IRON OXIDE COMPOSITE BEAD AS NOVEL ANTIMICROBIAL AND BIOREMEDIATION AGENT

Moumita Shee, Tamojit Santra, Swarnali Roy, Pratik Das, Piyali Basak
Biomaterials, Microbiology and Cell culture laboratory, School of Bioscience and Engineering, Jadavpur University, Kolkata
E mail- moumita.shee23@gmail.com

Composites of polymers and nanomaterials have emerged as a new domain in material science which promises to revolutionize the fields of modern therapeutics and environmental remediation. In this study polymer matrix nanocomposites of sodium alginate with iron oxide and tannic acid have been synthesized. They were characterized through volumetric, gravimetric, FTIR, XRD and SEM analyses. The physiological and magnetic properties of the beads were studied using pH dependent swelling, degradation and haemocompatibilty assays. The biological activities of the composites were also evaluated through antimicrobial and antioxidant assays. The in vitro antimicrobial activity of the composites was evaluated using *S. aureus* and *E. coli*. The in vitro antioxidant activity was determined using DPPH free radical scavenging activity assay. The industrial dye degrading potential of the composites were evaluated using malachite green, methylene blue and crystal violet dyes. A diverse study needs to be initiated to evaluate the potential of these composite materials as novel agents for addressing the ever growing issues of environmental remediation.

Keywords: Polymer matrix nanocomposites, antimicrobial, antioxidant, industrial dye degradation

P-I.73: STUDY OF ANTIBIOTIC RESISTANCE PATTERNS ACROSS BACTERIA ISOLATED FROM ENVIRONMENTAL WASTEWATER

Neha Bera[a], Meesha Singh[a], Sayak Ganguli[b], Mahashweta Mitra Ghosh[a]
[a] Department of Microbiology, St. Xavier's College, Kolkata 700016, India
[b] Theoretical and Computational Biology Division, AIIST, Palta 742122, India
Corresponding Author's Email address: mmgxaviers@gmail.com

The increasing emergence of antibiotic resistance among clinical pathogens threatens the health benefits that have been achieved with antibiotics. The detection of antibiotic resistant bacteria and antibiotic resistant genes in environmental wastewater such as sewage and industrial effluents is a major cause of concern. This study aims to identify patterns of drug resistance across bacterial isolates from environmental wastewater collected from West Bengal, India. The isolates were subjected to biochemical characterization which was followed by antibiotic susceptibility assay by disk diffusion method. Ampicillin resistance was reported to be the highest among the bacteria.

Key words: Antibiotics, multi-drug resistance, wastewater

P-I.74: PRODUCTION AND OPTIMIZATION OF Á-AMYLASE FROM NOVEL MARINE *STREPTOMYCES ENISSOCAESILIS*

P.S.V.N. SARVANI*, PEDDI PRIYANKA and D. SRI RAMI REDDY
Centre for Biotechnology, Department of Chemical Engineering, Andhra University Visakhapatnam
E mail: sarvanipammi.11@gmail.com

Amylases are starch degrading enzymes. Their application web is increasing as the knowledge on structural, biochemical and functional properties of enzymes is elucidated. Actinomycetes are gram positive filamentous bacteria well known for the production of bioactive compounds. Marine environment harbors a number of macro and microorganisms. In the present study, production of extracellular amylase under submerged fermentation has been carried out by employing our laboratory isolate, *Streptomyces enissocaesilis* that was previously isolated from a marine sample collected from Bay of Bengal, Visakhapatnam. The process parameters influencing the production of á-Amylase were carried to obtain the optimum yield of á-Amylase.

Key words: á- Amylases, marine actinomycetes, submerged fermentation, applications

P-I.75: A REVIEW ON ANTIMICROBIAL PROPERTIES OF *MORINGA OLIFERA* AND *ECLIPTA ALBA* FOR THE MANAGEMENT OF ESBL DISEASES

Pooja Mishra and Neha Chauhan*
Shri Guru Ram Rai University, Dehradun (U.K)
Email- sharmavpooja@gmail.com

A large number of outbreaks of infections due to ESBL producing organisms have been described on every continent of the globe. Extended spectrum of beta lactamase (ESBL) uropathogens create a major problem in clinical therapeutics. Resistance to antibiotic treatment in patients with urinary tract infection is a representative example of the increasing problem of antimicrobial resistance. *Escherichia coli* accounts for most uncomplicated pathogens among uropathogens accounting for 75-95% of all positive culture in uncomplicated cystitis. Increasing trends of antimicrobial resistance to uropathogens from UTIs require alternative treatment options. The study focused on searching the novel drug molecule for the treatment of ESBLs. Medicinal Plants such as *Moringa Oliefera* and *Eclipta alba* laden with numerous active bioingredients which has wide array of pharmacological properties, provides an alternative means of therapy for their effective treatment. So the resistance of bacteria against the conventional antibiotics needs urgent attention and thus necessitates for the development of the new drug molecule against ESBL infections.

P-I.76: OPTIMIZATION OF LIPASE PRODUCTION BY INDIGENOUS LIPASE-PRODUCING BACTERIA AND CHARACTERIZATION OF KINETIC PARAMETERS OF THE LIPASE

Aihik Banerjee, Mausam Sarkar, Priyanka Banerjee, Nandan Kumar Jana*
Department of Biotechnology, Heritage Institute of Technology, W.B. India
Corresponding author's E mail: nandankumar.jana@heritageit.edu

At a time when industries are increasingly embracing green technologies, natural biocatalysts or enzymes are attracting quite a lot of industrial attention. Although lipases have emerged as one of the leading enzymes with tremendous industrial potential, the high cost of production associated with these enzymes renders them uneconomical. As such, maximizing production of lipases with high enzyme activity becomes imperative for decreasing production cost and increasing industrial applications. Optimization of growth conditions is a simple way to enhance lipase production. Therefore, the primary objective of this work was to establish the optimum growth conditions that are required by indigenous lipase-producing bacteria for maximum lipase production. This was followed by an evaluation of the kinetic properties of the lipase. Using a one-parameter-at-a-time approach, the effects of production media composition (carbon source, carbon source concentration, nitrogen source, and nitrogen source concentration), inoculum volume, media pH, incubation temperature, and incubation time period, on lipase production were studied. Similarly, the kinetics of the lipase were studied by varying the reaction pH, reaction temperature, reaction time period, lipase volume, substrate volume, one at a time keeping all other parameters constant. Highest lipase production was observed when the bacteria were grown in a media composed of 2.5 % dextrose as the carbon source and 0.1 % NH_4Cl as the nitrogen source with an optimal inoculum volume of 0.4 ml in 10 ml of production media. The optimum media pH, growth temperature, and growth time period were found to be pH 9.0, 37 °C, and 48 hours respectively. The optimum conditions for the lipase catalyzed reactions were characterized by pH of 8.0, reaction temperature of 45 °C, and reaction time of 30 minutes, when 0.35 ml

of the lipase was added to 0.3 ml of the substrate solution (i.e. para-nitrophenyl laurate) and 0.35 ml of 50 mM Tris-Chloride buffer solution, for a total reaction volume of 1 ml. The values of KM and Vmax for the lipase were estimated to be 51.02 μM and 0.482 μM/min, respectively.

Keywords: Lipases, optimization, indigenous, growth conditions, pH, temperature, kinetics.

P-I.77: ISOLATION AND PRODUCTION OF BROAD ANTIBACTERIAL METABOLITE FROM NOVAL ACTINOMYCETES *STREPTOMYCES ENISSOCAESILIS* PVNRHB2 FROM BAY OF BENGAL

Priyanka Peddi, Besetty Rohit Sri Srinivas, Gunturu Mary Ratna Grace, Donthireddy Sri Rami Reddy, Nikku Murali Yugandhar
Centre For Biotechnology, Department Of Chemical Engineering, A.U. College Of Engineering, Andhra University, Visakhapatnam, Andhra Pradesh.
Email: priyankapeddi99@gmail.com

Recently, the increase of the pathogens resistant to antimicrobial agents has become a health problem. The study aimed at the isolation of marine actinomycetes that is capable of producing antibacterial activities. Seven marine sediment samples were collected from geographically different areas of East and West coast of India. Altogether 45 actinomycetes were isolated and were tested for their antimicrobial activities against different test bacteria to obtain potent actinomycetes. Among them, 10 isolates have showed broad antibacterial activity against different test bacteria. These 10 isolates were further screened and isolate B2 has shown strong and broad antibacterial activity against all the test bacteria. The isolate B2 was identified as *Streptomyces enissocaesilis* and deposited in GenBank with accession number was MH480670.

Keywords: Actinomycetes, Antibacterial activity, Amylase activity, Streptomyces

P-I.78: IDENTIFICATION AND BIOLOGICAL EVALUATION OF NOVEL ANTI-MICROBIAL INHIBITORS AGAINST MURD LIGASE

Punit Kaur[1], Pragya Tiwari[1], Priyanka Sharma[1], Arti Kapil[2] and AS Ethyathulla[1]
[1]Department of Biophysics and [2]Department of Microbiology, All India Institute of Medical Sciences, New Delhi – 110029
E mail: punitkaur1@hotmail.com

Acinetobacter baumannii, an opportunistic pathogen, has acquired antimicrobial resistance to known antibiotics necessitating development of novel therapeutics. MurD Ligase accounts for ATP-dependent addition of D-Glutamate to UDP-N-Acetylmuromyl-L-Alanine and consequent growth of peptidoglycan layer. *Ab*MurD protein was cloned, expressed and purified. Virtual Screening of ZINC natural compounds library yielded 100 potential inhibitors. Flexible docking filtered out 16 compounds and MD simulations identified two potential leads interacting at the binding site. These compounds were experimentally evaluated for their binding affinity and inhibitory potency. The results suggest that identified compounds can be explored as potential leads to target both Gram-positive and Gram-negative pathogens.

Keywords: *Acinetobacter baumannii,* MurD Ligase, inhibitor, molecular docking, MIC assay, ITC

P-I.79: ANTIOXIDANT AND ANTICANCER ACTIVITY OF *CALLISTEMON LANCEOLATUS* EXTRACTS

Ramesh Kumar and Abhay K. Pandey*
Department of Biochemistry, University of Allahabad, Allahabad-211002, India
E-mail: akpandey23@rediffmail.com

Free radicals are generated during aerobic metabolic processes in mitochondria as well as in other organelles associated with many degenerative diseases including cancer. Antioxidants neutralize free radicals hence could be useful in controlling cancer progression. The present study was designed to investigate antioxidant and anticancer activities of *Callistemon lanceolatus,* plant. Extracts exhibited appreciable reducing power and DPPH free radical scavenging. These extracts also displayed potent cytotoxic action against breast cancer cell lines MDA-MB-231 and MCF-7 during MTT assay. During mechanistic studies, extracts were found to adversely affect mitochondrial membrane potential, nuclear morphology and exhibited ROS mediated killing. Results suggested that phytochemicals present in *C. lanceolatus* have considerable antioxidant and anticancer activity.

P-I.80: *IN VITRO* AND *IN SILICO* STUDIES FOR THE ESTIMATION OF THERMODYNAMIC STABILITY OF PEROXIREDOXIN-6

Sana Qausain[1], Md. Khurshid A.Khan[1*]
School of Life Sciences, B.S. Abdur Rahman Crescent Institute Of Science & Technology, Chennai-48, India
E mail: sana.nt@crescent.education

Living organisms under aerobic conditions should protect themselves against the damage caused by transient reactive oxygen species (ROS). Prdxs have high expression levels under normal conditions which are considered to be responsible for reduction of ~90% of mitochondrial and ~100% of cytoplasmic H 2O2 thereby protecting the cells from oxidative stress. In this study biophysical parameters where estimated for peroxiredoxin 6 by invitro and *in silico* study. Our experimental study by using urea as denaturant and thermal denaturation changes were monitored by absorbance, fluorescence and CD experiments by making graph and calculating in term of both T_m and ΔG_D^o. From thermal denaturation study obtained Tm of prdx6 is 60°C, in isothermal experiment Cm-3M and ΔG_D^o 3.7 kcal mol-1**.** Our MD Simulations study suggests the average RMSD values of PRDX6 at 1.0 M, 3.0 M, and 5.0 M urea concentration were found to be 1.10 nm, 1.37 nm, and 1.85 nm, respectively. At 3.0 M urea concentration, the structure of PRDX6 deviated from its native conformations or it has started unfolding. At 5.0 there were large structural deviations found. This may be due to unfolding of PRDX6 at 5.0 M urea concentration. Root mean square fluctuation (RMSF) of the PRDX6 at 1.0 M, 3.0 M, and 5.0 M urea concentration were plotted as a function of residue number RMSF plot suggested that PRDX6 showed least residual fluctuations at 1.0 M urea concentration at 298 K. At 3.0 M urea concentration, there were slight increase in residual fluctuations were found. As the concentration of urea increases from 3.0-5.0 M, the residual fluctuations increased. The average SASA values for PRDX6 at 1.0 M, 3.0 M, and 5.0 M urea concentration were found to be 123.09 nm^2, 135.14 nm^2, and 141.46 nm^2, respectively.

Keywords: Prdx6, H2O2 Degradation, MD Simulation

P-I.81: IN SILICO PREDICTION OF STRUCTURE AND ENZYMATIC ACTIVITY IN HYPOTHETICAL PROTEINS OF *RICKETTSIA TYPHI*"

Sanjeewani D. Raut
Shri. Shivaji College of Arts, Commerce and Science, Akola
E mail: (sandy_akl@rediff.com)

Severity of *Rickettsia Typhi (rty)* for human is a present problem and asks for better research to understand the mechanism of pathogenicity and drug resistance. In view, genome data of rty highlighted, major regions codes for hypothetical proteins and could be getting involved in the severity of rty. In decision, web tools like CDD BLAST, INTERPROSCAN, PFAM and COGs have been implemented to search enzyme coding ability in these regions along with PS square structure prediction server for tertiary structure modeling. Study sorted 257 hypothetical proteins to code for specific enzyme based on conserved domain search by programs and **103 structures were built using** prediction server. Study highlighted and filtered the uncharacterized regions of kpn possessing ability to code enzyme.

Key Words: *Rickettsia typhi*, Hypothetical proteins, Enzymatic activity, Conserved domains, Protein structures, Genome

P-I.82: MAGNESIUM OXIDE NANOPARTICLE REJUVENATES THE OBSOLETE ANTIBIOTIC TETRACYCLINE AGAINST MDR BACTERIA

Shatabdi Das[1], Kumari Vishakha[1], Sandhimita Mondal[1*], Arnab Ganguli[1]
[1] Department of Microbiology, Techno India University, West Bengal
EM-4 Sector-V, Salt Lake City, Kolkata, West Bengal, India, Pin code – 700091
E mail: ganguli.arnab009@gmail.com; sandhimita@gmail.com

Worldwide, Emergence of bacterial antimicrobial resistance has become a crucial problem in everyday life. In this context, the field of research is to regenerate the obsolete antibiotics like tetracycline against MDR pathogens. The objective of this study is to synthetize, characterize and evaluate the antibacterial and ant biofilm activity of tetracycline doped MgO nanoparticles against drug resistance pathogens. Formation and characterization of nanoparticles was evaluated using DLS, FTIR, XRD, SEM techniques. It was also observed that tetracycline doped MgO has capability to reduce both sessile and planktonic form of drug resistance pathogenic bacteria. This study is highly promising to relaunch the demoded antibiotics in medical field with limited health care budgets.

Key words: Tetracycline, Magnesium oxide nanoparticle, MDR-food borne bacteria, Antimicrobial, Antibiofilm

P-I.83: STUDY OF HYPERSENSITIVITY USING INHIBITORS OF HISTIDINE DECARBOXYLASE

Sneha Bhatt, Gletta Anjaly, C.T, Shlini P*
Department Of Biochemistry, Mount Carmel College, (Autonomous) Palace Road
Bengaluru - 560052, Karnataka, India
E mail: shlinip1@gmail.com

Hypersensitivity is a prevalent global health concern associated with inappropriate response of the immune system to environmental agents such as pollen, glen, etc., They elicit a response termed as anaphylaxis. More than 20% of the world population is affected by allergies and the numbers are to increase drastically due to pollution and lifestyle changes. Currently, antihistamines like Cetirizine, Loratadine, etc., are used. These are the fourth- generation antihistamines, yet, they are deleterious side effects associated with it. Thus, it is the need of the hour to have an alternate to these antihistamines. The purpose of the study was to find an alternative to these antihistamines by inhibiting the enzyme histidine decarboxylase which is responsible for the production of histamine. Histamine is produced by the action of histidine decarboxylase on the substrate, histidine. The histidine decarboxylase from *Enterobacter* was isolated and purified using ammonium sulphate precipitation, Ion-exchange chromatography and Gel Permeation chromatography. The study of enzyme kinetics determined the optimum temperature to be around 50! and the optimum pH was found to be 4 with the citrate buffer. The K_m and V_{max} obtained was 0.5 mM and 0.001 IU respectively. A spectrophotometric method was employed to study the activity of the enzyme using Alizarin Red S and Nickel Sulphate. It showed the peak absorbance at 620nm. The inhibition study was carried out using spice extracts to bring about partial inhibition of the enzyme. The spice extracts were analysed for flavanoids by HPLC which indicated the presence of Gallic acid, Ellagic acid, Quercetin and Kaempferol. The overall result indicated that flavonoids present in the spice extracts were responsible for the inhibition of the enzyme. These flavanoids were further used to study the binding affinities to the enzyme using in-silico docking studies.

Keywords: Anaphylaxis, antihistamines, histidine decarboxylase, mast cell degranulation, flavonoids, docking

P-I.84: EVALUATION OF ANTIDIABETIC ACTIVITY OF *EMBELIA ROBUSTA* SEED EXTRACT IN ALLOXAN INDUCED DIABETIC WISTAR RATS

Sharada Seekonda[1*], A.Roja rani[1]
Dept. of Genetics and Biotechnology, Osmnia University, Hyderabad, Telangana
Email: sharada.msc@gmail.com

Embelin [2, 5-dihydroxy-3-undecyl, 2-cyclohexadiene-1,4-benzo-quinone] as a major bioactive constituent. Alloxan (130mg/kg body weight) induced diabetic rats. The 30 adult wistar rats were randomly divided into 5-groups of 6 rats. Group-I: normal control, Group-II: diabetic control, Group-III: standard (Gliclazide 50mg/kg body weight orally), Group-IV & Group-V test groups treated with *E. robusta* at the doses of 50 mg/ kg, and 100mg/ kg of body weight orally for 28days. Fasting blood glucose levels were significantly ($P<0.05$) lowered in the test groups IV & groups V with 50 and 100 mg/ kg body weight of extract which are comparable to the standard drug gliclazide.

Key words: Embelin, Alloxan, Gliclazide

P-I.85: THE ROLE OF LEUCINE RESPONSIVE GENE (*LRP*) IN REGULATING STRINGENT RESPONSE DURING RECOMBINANT PROTEIN EXPRESSION IN *ESCHERICHIA COLI* MOLECULAR EVOLUTION AND *IN-SILICO* ANALYSIS OF PLANT POLYAMINE OXIDASES

Shashidhara KS and MSP Kanavi
Department of Genetics and Plant Breeding, College of Agriculture, Karekere, Hassan-573225, Karnataka, India
E mail: shashi2k4@gmail.com

Full length amino acid sequences of 46 Polyamino oxidases (PAO) and 8 Diamino oxidases (DAO) were retrieved from sequence repositories. PAOs belongs to 21 and DAOs to 5 families. Multiple sequence alignment of amino-acid sequences identified conserved residues Glycine, Glutamic acid, Alanine, Arginine, Tryptophan, Proline, Valine, Leucine, Phenylalanine, Tyrosine & Lysine and Glycine is most conserved. Phylogenetic analysis revealed three main clades A, B and C. PAO and DAO genes of plants, *Arabidopsis thaliana*, *Brachipodium*, *Glycin max*, *Oryza sativa* present on different chromosomes. Comparative modeling done to build 3D structure of amino oxidases. Ramachandran plot showed more than 90% residues in most allowed regions.

Key words: Amino Oxidases, molecular evolution, Phylogeny, 3D structure, Cellular localization

P-I.86: THE ROLE OF LEUCINE RESPONSIVE GENE (*LRP*) IN REGULATING STRINGENT RESPONSE DURING RECOMBINANT PROTEIN EXPRESSION IN *ESCHERICHIA COLI*

Shubhashree Mahalik[*], Debashrita Mittra[1], Dibyaranjan Das[2]
P.G. Department of Biosciences & Biotechnology, Fakir Mohan University, Balasore, Odisha
E mail: shubhashreemahalik@gmail.com; debashrita.mittra@yahoo.com

Induction of recombinant protein leads to a stringent response which shuts down several amino acid biosynthesis genes. This is the primary reason for the drop in both growth and productivity. The Leucine Responsive Gene (*Lrp*) stimulates biosynthetic operons and help cells adapt to changes in the nutritional environment. It is the main regulator controlling the synthesis of amino acids. The differential expression patterns of genes under *lrp* regulation were analyzed from the transcriptomic profile of recombinant *Escherichia coli* cultures. They were functionally classified to identify the metabolic pathways that differentially express and regulate stringent response during recombinant protein production.

Keywords: Recombinant protein, Transcriptomics, Nutrition, Stringent response, *Escherichia coli*

P-I.87: NARINGIN EXHIBITS ANTIBACTERIAL AND ANTI-BIOFILM ACTIVITIES AGAINST METHICILLIN-RESISTANT *STAPHYLOCOCCUS AUREUS* (MRSA)

Simran Sinsinwar and Vellingiri Vadivel*
Chemical Biology Lab (ASK-II-409) School of Chemical and Biotechnology,
SASTRA Deemed To Be University, Thanjavur, Tamilnadu, India
**E-mail: vadivel@carism.sastra.edu*

Staphylococcus aureus is one of the major pathogens to cause health care-associated, device related and community acquired infections in human. In present study, antibacterial and antibiofilm activities of naringin against MRSA and its clinical isolates were studied using zone of inhibition (15-18.5 mm), MIC (0.1562-0.3125 mg/ml), growth curve, nucleotide leakage (27.3 and 22.98 fold increase at 260 and 280 nm) and cell membrane integrity by fluorescence microscopy. Naringin at its sub-MIC concentration exhibits biofilm inhibition (72.02 %), which was visualised by SEM, capable enough to inhibit slime layer, reduction of exopolysaccharide and hydrophobicity. Naringin can be alternative to conventional antibiotics.

Key words: Naringin, Antibacterial activity, Anti-biofilm, MRSA

P-I.88: CONTROL OF PATHOGENS AND COMMON INFECTIOUS DISEASES IN ORNAMENTAL FISH USING ORGANIC SUPPLEMENTS

Souvik Banerjee[1*], Rajnandini Roy[1], Suchismita Sikdar[1] and Tannistha Biswas[1]
[1] Department of Microbiology, St. Xavier's College (Autonomous) Kolkata
Email: (souvik97kol@gmail.com)

Microbial growth in ornamental fishes causes fin and gill rot of fish. Source of infection is mainly contaminated water/food. In this investigation bacteria and fungi isolation from fish food (both natural and artificial) and gills-fins of dead (dying prematurely) goldfish was done. Bacterial species like *Staphylococcus* sp, *Escherichia coli* were identified. Fungal species identified was *Saprolegnia* sp. Main challenge was to disinfect water using natural/ artificial compounds like extracts of sesame, pudina, rye, ginger as Sample A, neem, oregano, turmeric, kalmegh as Sample B and Ketoconazole as Sample C. Out of these mixtures tested in terms of slide bioassay and MIC, Sample B was found to be most effective in protecting fish and reducing pathogenic bacterial load.

Keywords: gill rot, kalmegh, oregano, Ketoconazole, MIC, slide-bioassay

P-I.89: A COMPARATIVE STUDY ON PHYTOCHEMICAL AND ANTIMICROBIAL ACTIVITY OF *OCIMUM SPP.*

Susinjan Bhattacharya
Department of Biotechnology, Jaypee Institute of Information Technology, A-10, Sector 62, Noida-9, Uttar Pradesh
E mail: sushinjan@gmail.com

Tulsi (*Ocimum* spp.) is an aromatic plant which belongs to the family of Lamiaceae. Scientific studies show that it has multidimensional medicinal properties. Tulsi can be divided mainly into two broad categories holy basil (*Ocimum sanctum*) and mediterranean basil (*Ocimum basilicum*). The present study was carried out to study the comparative analysis of phytochemical and antimicrobial activity of three Tulsi species, namely Rama Tulsi (*Ocimum sanctum*), Krishna Tulsi (*Ocimum tenuiflorum*), and Thai Basil (*Ocimum thyrsiflora*). The study revealed that all the three species possess varied amounts of phytochemicals qualitatively and the best antibacterial activity was shown by *Bacillus subtilis*.

Key words: Rama Tulsi, Krishna Tulsi, Thai basil, antibacterial properties, phytochemicals

P-I.90: MOLECULAR DOCKING ANALYSIS OF SESQUITERPENES AS HIV-1 ENTRY INHIBITORS TARGETING GP41 POCKET

Swapna Gurrapu[1] and Estari Mamidala[2]
[1,2] Infectious Diseases Research Lab, Department of Zoology, Kakatiya University, Warangal-506009, Telangana State, India
*Email: swapnagurrapu@kakatiya.ac.in, *drestari@kakatiya.ac.in*

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 cyclozonarone 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 cyclozonarone as a valuable natural molecule in the treatment and prevention of HIV- 1 Entry Inhibitors targeting gp41.

Key Words: Sesquiterpenes, Cyclozonarone, Gp41, HIV-1

P-I.91: COMPUTER-AIDED DRUG DESIGN OF NONPEPTIDIC FALCIPAIN 2 INHIBITOR: VIRTUAL SCREENING, DOCKING AND MD SIMULATION

Rajguru T[1, 2*], Bora D S[2], Modi M K[1, 3]
[1] Department of Agricultural Biotechnology, AAU, Jorhat, Assam
[2] Department of Life Sciences, Dibrugarh University, Dibrugarh, Assam
[3]Distributed Information Center, AAU, Jorhat, Assam
**Corresponding author Email: trisha.rajguru@gmail.com*

Falcipains (FPs) are major haemoglobinase of *Plasmodium falciparum* required for parasite growth and development. Prior attempts to develop peptide-based drugs against them have been futile due to its susceptibility to degradation by host enzymes. Here we report the computer-aided design of four new nonpeptidic inhibitors against FP-2. During the design, an initial virtual library of PubChem database was focused down to 800 drug-like compounds and finally, virtual-screened and docked to identify 4 promising compounds which were further equilibrated by Molecular Dynamics Simulation. These are being validated in the wet lab for the eventual development of an anti-malarial drug.

Keywords: Falcipain 2, Docking, MD Simulation, Virtual Screening

P-I.92: *FICUS RELIGIOSA* EXTRACT AUGMENTS HUMAN NEURAL CELLS TO SUPPRESS THE OXIDATIVE STRESS INDUCED DNA DAMAGE

M. Suresh Kumar Reddy, and **Vadde Ramakrishna***
Department of Biotechnology & Bioinformatics, Yogi Vemana University, Kadapa–516003 Andhra Pradesh
Email: vrkrishna70@gmail.com

Amassed evidence suggests that the polyphenolic antioxidants present in plants play important roles in the prevention of oxidative stress in neurological disorders. As the sacred fig (*Ficus religiosa*) or Bodhi tree is a most celebrated tree in the Indian traditional medicinal system, Ayurveda. Its parts have been routinely use in the treatment of various diseases including neurological and memory enhancer, but no scientific studies have been undertaken to substantiate these claims. In present study, *Ficus religiosa* extracts of bark showing high antioxidant potential with enriched phenolics and exhibited high free radical scavenging activity as compared to leaf and fruit. Further neuroprotective properties of extract against oxidative stress induced DNA damage and repair was evaluated through MTT assay, and observed potential suppressive effect on H2O2 induced cytotoxicity and also promotes cell growth. Comet assay results also reveals an effective neuroprotective effect of bark extract against H2O2 induced DNA damage. The role of DNA Topo IIâ, Ku70, and DNA polymerase ì during DNA damage and repair in the presence of extracts in neural cells on H2O2 induced DNA damage was evaluated and observed the bark extract protects the DNA damage caused H2O2 in SKNSH cells by restoring all proteins which are involved in repairing DNA damage in cells. In conclusion, extract prevented H_2O_2 induced oxidative stress and can be feat as potential oxidative eliminators.

Keywords: Neural cells, proliferation, oxidative stress, DNA damage and repair, *Ficus religiosa*

P-I.93: ASSOCIATION BETWEEN ALCOHOLS INDUCED BRAIN OXIDATIVE STRESS AND ENDOCRINESTATUS: BENEFICIAL ROLE OF *P.SANTALINUS*

Saradamma Bulle[1], Pulakuntla Swetha Reddy[2], Kiran Bharat Lokhande[4], Venkateswara Reddy Kanu[3], Varadacharyulu NC[1], Venkateswara Swamy K[4] and Vaddi Damodara Reddy*[1]

[1]Department of Biochemistry, Sri Krishnadevaraya University, Anantapuramu 515 003, India

[2]Division of Molecular Oncology, Institute of Cancer Prevention and Research, Noida, UP-201301

[3]DR Biosciences, Research and Development Institute, Bettahalasur, Bengaluru, Karnataka, 562 157

[4]Bioinformatics Research Laboratory, Dr. D. Y. Patil Biotechnology and Bioinformatics Institute, Pune-411033, India

Email: reddidamodar@gmail.com

Chronic and excessive alcohol consumption causes numerous biochemical changes in nervous system. Results showed increased rat brain oxidative stress with elevated nitric oxide levels. Moreover, we noticed decreased testosterone, thyroid hormones (T_3 and T_4), increased concentrations of estradiol and cortisol in alcohol administered rats compared to controls. Alcohol administration also decreased antioxidant status. *In silico* studies performed to see the association between hormones and phytocompounds, which are present in *P.santalinus.* Results showed that â-sitosterol showed maximum inhibition compared to pterostilbine and resveratrol. In conclusion, the phytocompounds present in *P.santalinus* showed protection against alcohol-induced oxidative stress mediated hormonal alterations.

Keywords: Alcohol, Brain, Endocrine status, Oxidative stress, Molecular Docking

P-I.94: OXIDATIVE STRESS INDUCED PLASMA MEMBRANE ION LEAKAGE INDEPENDENT MITOCHONDRIAL DEHYDROGENASE ACTIVITY IN *SACCHAROMYCES CEREVISIAE*

Shafaque Asif, Gurjeet Kaur, Vineet Awasthi*
Amity Institute of Biotechnology, Amity University Uttar Pradesh, Lucknow Campus, Lucknow (India) 226028 (AIB/RA/278)
Email: vawasthi@lko.amity.edu

Maintenance of plasma membrane integrity is crucial for cell survival and various cellular functions through the redox homeostasis and membrane polarisation by the enzymatic and non-enzymatic activity via transplasma membrane electron transport (TPMET). The membrane impermeable potassium ferricyanide [HCF (III)] is a widely used exogenous oxidant. Prolonged exposure of ferricyanide causes oxidative stress which damages the membrane lipids leading to its peroxidation and elicits the permeability of plasma membrane resulting in ion leakage. Our study states that potassium ferricyanide increases lipid peroxidation by 33.32±0.93%, ion leakage by 30.97±0.98 % and also increases TPMET by 17.99±1.93% at 1.0 mM of [HCF (III)]. On the contrary, there was no effect on the mitochondrial dehydrogenase activity as measured by 3-(4,5-dimethylthiazol-2-*yl*)-2,5-diphenyltetrazolium bromide) MTT assay. The study suggests that membrane ion leakage is independent of mitochondrial dehydrogenase activity.

Keywords: TPMET, Ion leakage, Lipid peroxidation, MTT

P-I.95: NOVEL NANOINSULIN FORMULATION ACCELERATES BURN WOUND HEALING IN MICE

Sandip Ghosh[2], Pawandeep Kaur[1], Diptiman Choudhury[1], Biswarup Basu[2*]
1. School of Chemistry and Biochemistry, Thapar Institute of Engineering and Technology, Patiala, Punjab, India
2. Department of Neuroendocrinology, Chittaranjan National Cancer Institute, Kolkata
**Corresponding email: biswarup.basu@gmail.com*

Insulin has been very rarely reported to have local effect on wounds. Very recently we have reported synthesis of a nano insulin formulation which by modulation of pro and anti-inflammatory cytokines demonstrated higher dermal wound healing efficacy in normal and diabetic condition. Here we similarly synthesized insulin loaded silver nanoparticles (IAgNPs) and explored its efficacy on Burn wound healing. Third degree burn was induced on *Swiss albino* mice and nano formulation was applied everyday till healing. IAgNPs showed accelerated wound healing efficacy compared to saline treated or standard burn treatment. The mechanism of healing was attributed to higher cellular proliferation and angiogenesis, modulation of cytokines accompanied by rapid epithelization of wound tissue bed.

Keywords: Burn Wound, Insulin, inflammation, Epithelization

P-I.96: ANTIOXIDANT ACTIVITY AND TRYPSIN INHIBITION OF *GARCINIA CAMBOGIA*

C. K. Sumachirayu, C. G. Kusuma, Vinod Gubbiveeranna, S. Bhavana, S. Nagaraju*
Department of Studies and Research in Biochemistry, Tumkur University, Tumkur – 572103
Email: nagarajubiochem@gmail.com; nagaraju@tumkuruniversity.ac.in

Garcinia cambogia is native to south eastern Asia. Different solvent extractions of *G. cambogia* seeds were prepared and evaluated for antioxidant activity and trypsin inhibition. Methanol extract has shown potential antiradical activity and trypsin inhibition. Gas chromatography Mass spectrometry (GC-MS) analysis has shown different phytoconstituents may be responsible for antiradical and trypsin inhibitory activities.

Key words: *Garcinia cambogia*, antioxidant, DPPH, trypsin

P-I.97: STUDY ON PARENTAL RISK FACTORS ASSOCIATED WITH CONGENITAL HEART DISEASE

Kanak Mahajan[1], Sanjeev Digra[2], and Parvinder Kumar[1]
[1]Institute of Human Genetics, University of Jammu, J&K, 180006
[2]Department of Paediatrics, S.M.G.S. Hospital Jammu, Government Medical College, Jammu, J&K, 180006
E mail: kanak.293@gmail.com

Congenital heart disease (CHD) is the most common developmental anomaly and cause of mortality in new-borns. CHD is categorised by any structural and functional defects in heart that occurred at the time of birth. The disease has multifactorial origin and involves many genetic and non-genetic risk factors viz. parental age,gestational malnutrition, self-medication, historyof miscarriages/abortions, family history, consanguinity, and gene mutations. The present study was a hospital based study, undertaken to evaluate the prevalence of different maternal and paternal risk factors associated with CHD in Jammu region of J&K State. For the study purpose, a total of 72 confirmed patients were enrolled who was attending OPD of Paediatrics, S.M.G.S. Hospital Jammu. In our study, younger maternal age i.e. e”25 was found to be associated with CHD. CHD phenotypes such as VSD, ASD and PDA are found to be associated with younger maternal age. Other factors like self-medication (13.8%), history of miscarriages (15.3%), family history(6.94%), and consanguinity (19.4%) also appeared to be important risk factors observed in the present study.

Keywords: Congenital Heart Disease, parental risk factors, Jammu.

P-I.98: *IN SILICO* MOLECULAR DOCKING STUDIES OF MERODITERPENOIDS AGAINST FOXO1

Rakesh Davella[1] and Estari Mamidala[2]
[1,2] Infectious Diseases Research Lab, Department of Zoology, Kakatiya University, Warangal-506009, Telangana State, India
E mail: rakeshdavella1523@gmail.com

In spite of the global occurrence of type-2 diabetes mellitus (T2DM) infection and lack of auspicious treatment for Diabetes patients, there are only a few drugs accepted for the managing of infected patients. The objective of this study is the evaluation of Mero-diterpenoid compounds for anti-T2DM activity. *In silico* anti-T2DM lead prioritization was performed on a set of known compounds from *Stypopodium flabelliforme*. The energy minimized structures of these molecules were docked into FOXO1. Docking experiments were done using Autodock software for nine compounds docking with FOXO1. In the present study, **9** compounds (Atomarianone-A, flabellinol, flabellinone, Isoepitaondiol, stypodiol, stypoldione, stypoquinonic-acid, stypotriol, taondiol.) were docked into FOXO1 and out of nine, one compound, Flabellinol indicated high binding score (-8.41 kcal/mol) and the residues SER: 205, 212 TRP:160,209 PHE:197 LYS:200 TYR:165,196 GLY:208 ASN:158 were might play important roles in binding with these compound.

Keywords: Docking, FOXO1, *Stypopodium flabelliforme,* Diabetes mellitus

P-I.99: UNDERSTANDING THE ROLE OF MYCOBACTERIA SECRETED PknG PHOSPHORYLATED SODD IN PREVENTING MACROPHAGE APOPTOSIS

Saradindu Saha and Somdeb Bose Dasgupta
Molecular Immunology and Cellular Microbiology Laboratory
Department of Biotechnology, Indian Institute of Technology Kharagpur
E mail: saradindusaharkm@gmail.com

Mycobacterial pathogenesis occurs predominantly by preventing phagolysosome formation failing which macrophage apoptosis is induced to kill the pathogen along with it. Our lab has identified how mycobacteria secreted virulent kinase Protein kinase G (PknG) phosphorylates macrophage suppressor of death domain (SODD) to prevent its removal from the death domain of TNFaR and thereby hinders caspase8 activation and apoptosis. Phosphorylated SODD through its DD sequesters TRADD and thereby prevents RIP1 mediated necroptosis. Overall it is evident that secreted PknG prevents TNFa induced macrophage apoptosis thus allowing mycobacteria to establish its niche within the macrophage.

P-I.100: ASSESSMENT ACUTE TOXICITY FOR COMBINATION OF TRIAZOPHOS AND DELTAMETHRIN TO A FRESH WATER FISH, C*HANNA PUNCTATUS* AND ITS IMPACT ON STRESS PARAMETERS

Shikha Singh and Ravi S. Pandey*[a]

[a]*Department of Biochemistry, University of Allahabad, Allahabad-211002, India*

**Corresponding author e-mail:rspandey2004@yahoo.com*

Various groups of pesticides are used to control the target pests but they indirectly affect the non- target organisms like fish. In the present study, the acute toxicity for a mixture of triazophos and deltamethrin was evaluated for 96 h in *Channa punctatus*. The LC_{50} for pesticide was found to be 0.032 mg/L. To evaluate its impact fishes were exposed to 5 and 10% of LC_{50} for 96 h. Significant changes in SOD, CAT, GST and content of GSH and LPO were recorded after exposure of pesticides at sub-lethal concentration. This may adversely affect the health of fish and decline their population.

Key words: Triazophos + Deltamethrin, *Channa punctatus*, $LC_{50,}$ Stress parameters

Symposium-II: Agricultural Biotechnology: Science for Lab to land.

P-II.01: EXTRACTION AND ISOLATION OF CURCUMINOIDS FROM SELECTED *CURCUMA SPECIES*

A S Annapurna and Umesh T G
Department of Botany, Bangalore University, Bengaluru-560 056
Email: annapurna206@gmail.com, drtgumesh@gmail.com

Curcuminoids are polyphenol bioactive compounds found in *Curcuma longa*, the traditional spice of India. It is highly recognized for being potential nutraceutical against cancer, diabetic, inflammation and neurodegenerative diseases. Apart from *C longa*, Curcuminoids are also present in other species of Curcuma. In present study, these bioactive molecules were isolated from *C amada, C aeruginosa* and *C longa,* using methanol, ethanol and acetone as extraction solvents. The separation of Curcumin, Demethoxycurcumin and Bisdemethoxy Curcumin is achieved on TLC using Chloroform: Methanol (95:5) as mobile phase. HPLC technique is used to analyze the quality of different samp les of three *Curcuma* species.

Key words: Polyphenols, Curcumin, Demethoxycurcumin, Bisdemethoxy curcumin and HPLC

P-II.02: SCIENTIFIC EXTRAPOLATIONS ON ENHANCED ANTIMICROBIAL AND ANTIBIOFILM ACTIVITY OF A FORMULATED HERBAL MOUTHWASH FROM *ZINGIBER OFFICINALE* AND *ALLIUM CEPA* WITH EFFECTS ON CELL CYTOTOXICITY AND DNA REPLICATION OF BACTERIA ISOLATED FROM THROAT INFECTION

Abarna Chatterjee[1], Dibyajit Lahiri[1#], Moupriya Nag[1#], Prateek Banerjee[1], Shreyasi Ghosh[1],Bandita Dutta[2#], Sudipta Dash[1],Rina Rani Ray*[2]

Department of Biotechnology, University of Engineering & Management, Kolkata
Department of Biotechnology, University of Engineering & Management, Kolkata
Department of Biotechnology, Maulana Abul Kalam Azad University of Technology, West Bengal
Department of Biotechnology, Maulana Abul Kalam Azad University of Technology, West Bengal
*E-mail: *raypumicro@gmail.com*

Overuse of antibiotics and drugs for the treatment of bacterial pathogenesis has resulted in the formation of immune- tolerant and antibiotic resistant organisms. Thus, a new category of chronic infections caused by bacteria growing in slime-enclosed aggregates known as biofilms are affecting millions of people in the world. With an aim to perform a comparative study with herbal alternatives of the drug our work revealed better antibiofilm efficacy of two Indian ethno-botanical plants- *Allium cepa* (Onion) and *Zingiber officinale* (Zinger) compared to azithromycin against bacterial biofilms isolated from the pharyngeal region during acute pulmonary infection. The result showed that the Zinger extract was 44.4% more efficient than the Azithromycin in terms of reducing viability of the bacterial cell. The antibiofilm efficacies of the herbal extracts were confirmed by Scanning Electron Micrography. Phytocompounds isolated from *Allium cepa* and *Zingiber officinale* were docked in silico with the receptor biofilm forming proteins and docking sites were compared with antibiotics for its subsequent use as putative drugs. Further these two extracts were

mixed in suitable ratio to formulate a mouthwash for gurgling, in vitro application of which showed more effectiveness than a commercial mouthwash. Hence an herbal mouthwash for gurgling may be developed for commercial use to combat throat infection instead of using antibiotics at a higher dose.

Keywords: biofilm, *Allium cepa*, *Zingiber officinale*, mouthwash, antibiotic resistance, throat infection, plant extract

P-II.03: ISOLATION AND IDENTIFICATION OF BIOACTIVE METABOLITES FROM *IN VIVO* AND *IN VITRO* TISSUES OF *ASYSTASIA GANGETICA (L)*

Abhirami Dilkalal and Umesh T G
Department of Botany, Bangalore University, Bangalore, Karnataka-560056
Email: abhi.dilkalal@gmail.com, drtgumesh@gmail.com

Bioactive compounds in plant either as pure compounds or as standardized extracts provide a good source for new drugs. Polyphenols are one such group of compounds, which provides a wide range of biological activities. In the present study polyphenols were extracted and purified from leaf, stem and callus tissues of *Asystasia gangetica (L)* using 80% ethanol and the crude extract were further purified with Column chromatography using chloroform and methanol. Active fractions were analyzed for total phenolic content, flavonoids, Antioxidant activity, reducing power and Iron chelation activity. Further, identification of bioactive compounds was performed using LC/MS.

Key words: Polyphenols, *Asystasia gangetica*, Column chromatography, Antioxidant, LC-MS

P-II.04: APPLICATION OF CITRAL NANOEMULSION BASED EDIBLE COATING FOR THE PRESERVATION OF MINIMALLY PROCESSED PINEAPPLES

Anand Prakash[a], Revathy Baskaran[b] and Vadivel Vellingeri[a*]
[a]*Chemical Biology Lab (ASK-II), School of Chemical and Biotechnology, SASTRA Deemed University, Thanjavur, India*
[b]*Department of Fruit and Vegetable Technology, Central Food Technological Research Institute (CSIR-CFTRI), Mysore, India*
E-mail: vadivel@carism.sastra.edu

Effect of sodium alginate based edible coating containing different concentrations of citral nanoemulsion i.e. 0.1% (NE1), 0.5% (NE2) and 1% (NE3) on the shelf life extension of minimally processed pineapples was evaluated. Nanoemulsion incorporated edible coatings had droplet diameters of 66.67–131.08 nm. NE2 and NE3 coated pineapple samples had better color retention, lower respiration rates and reduced microbial growth during storage at 4°C for 12 days. NE2 coated pineapple caused ~2.2 log CFU/g reduction of artificially inoculated *Salmonella enterica* and *Listeria monocytogenes*. As higher citral concentration in NE3 decreased its sensory acceptance, NE2 could be explored for commercial preservation.

Keywords: Citral, Nanoemulsion, Edible coating, Pineapple

P-II.05: ANALYSIS OF BIOACTIVE COMPOUNDS PRESENT IN *RUMEX VESICARIUS* AND *TERMINLIA CATAPPA* PLANT

Anandika Suryavanshi, Anand Murari Saxena
Department of Zoology, University of Lucknow, Lucknow, Uttar Pradesh, India
Email: anandika02@gmail.com, anandmsaxena@rediffmail.com

The study was carried for the primary identification of bioactive compounds from different solvent extracts of *Terminalia catappa* and *Rumex vesicarius* plant. For this dry form of whole plant of T. catappa and R. vesicarius were used for extraction of phytoconstituents using different solvents with soxhlet method. These extracts were then analysed for various phytochemical tests. Result revealed - ethanol and methanol are better solvent for extraction, and types of bioactive compounds present in these plants are phenols, alkaloids, flavonoids, terpenoids, glycosides and tannins. Both plants are rich source of potential bioactive compounds imparting medicinal property therefore crucial for further study.

Keywords: *Terminalia catappa, Rumex vesicarius*, bioactive compound.

P-II.06: ION BEAM INDUCED MUTATION AND EPIGENETIC MODIFICATION IN RICE PLANT

Anish Kumar Tiwari[1*], Vikas Baranwal[2], Prashansha Singh[2], Jigyasa Kumar[2], Shraddha Shukla[2], Avinash C. Pandey[1]

[1, 2] Nanotechnology Application Centre, University of Allahabad, Prayagraj-211002, India*

[1]Inter University Accelerator Centre, New Delhi-110067, India

E mail: anish1993tiwari@gmail.com

In nature genetic modification mainly occurs due to mutation. Without mutation, the breeding programme of plants is not possible. There is a number of chemical, biological, physical processes are available to induce mutation but recently ion beam technology emerged as a new form of physical mutagen for the induction of mutation in plants, to produce new verities of various plants, in place of X-rays, Y-rays, and neutrons. The main aim of ion beam induced mutation in plant breeding is to modify and develop Novel mutants (such as drought resistance, high productivity, high nutrient use efficiency etc.) and their related genes. This process is made possible due to high RBE (Relative Biological Effectiveness) of ion beams of growth inhibition, fatality etc. Most effective LET value for inducing mutant sectors without causing severe damage of genetic material is lies between (30-110 KeV/μm). Results awaited but previous studies suggested that ion beam generate high mutation frequency (mutation causes deletion of several base pair long genetic material which results in irreparable DNA damage) as well as wide mutation spectrum.

Key words: ion beam, mutation, RBE, LET

P-II.07: HPLC PROFILE OF *IN VITRO* RAISED CLONES AND MOTHER PLANT OF *CELASTRUS PANICULATUS*ENDANGERED MEDICINAL PLANT

Anusha T S, Elyas K K
Department of Biotechnology, University of Calicut, Kerala, India
E-mail: anushatsbiotech@gmail.com

Celastrus paniculatus Willd (Celastraceae) is a large, woody climbing shrub commonly known as 'Jyotishmati' is an important medicinal plant in India. It contains rich variety of bioactive constituents and well known for its ability to improve memory. Due to its high pharmaceutical applications, this species has been over exploited and is now considered as endangered species. The present investigation was focused on the development of an efficient micropropagation protocol for the large scale production of *C. paniculatus*. HPLC method was employed for the identification and quantification of Celastrol from the leaf extract of mother plant and *in vitro* raised clones.

Key words: *C. paniculatus*, Micropropagation, Celastrol, HPLC, Stomatal studies

P-II.08: *ANACARDIUM OCCIDENTALE* ROOT EXTRACTS AS Á-AMYLASE INHIBITORS: AN *IN VITRO* APPROACH TO REDUCE POST PRANDIAL HYPERGLYCEMIA

Archana T M and *Sudheesh S
School of Chemical Sciences, Kannur University, Kerala
**Email: sudheeshatl@yahoo.co.uk*
Email: ms.tmarchana@gmail.com

The present study is focussed on an *in vitro* approach to screen the anti-diabetic potential of four different solvent fractions (Petroleum ether, Chloroform, Ethyl acetate and 80% methanol) of *Anacardium occidentale* root denoted as PE AO, CH AO, EA AO and 80%M AO respectively, mainly emphasising on the reduction of post prandial glucose levels through the inhibition of á-amylase enzyme and its mode of inhibition. Ensuing to standard acarbose drug, 80%M AO (IC_{50} value=1.69 mg/mL) was the best among the 4 extracts to exhibit an uncompetitive mode of inhibiting the alpha amylase enzyme. Also, 80% M AO possessed potent anti-oxidant activity among the extracts (IC_{50} value =0.026 mg/mL).

Key Words: á-Amylase; Enzyme Kinetics; Antioxidant activity; *Anacardium occidentale*.

P-II.09: ISOLATION AND IDENTIFICATION OF ENDOPHYTIC BACTERIA FROM DAY FLOWER OF *COMMELLINA BENGHALENSIS*

Archana S. Injal[1], Tejaswini C. Mendke[2], Tara N. Matnale[3] and Somnath Kshirsagar[4]
[1]Department of Genetics, [2]Department of Nanotechnology, [3]Department of Biotechnology, Walchand college Of Art and Science, Solapur
[4] Department of Zoology, K.N. Bhise College of Arts and Science, Kurduwadi
E mail: tejaswini.mendke@gmail.com

A recent trend in the medical field is use of weed plant to produce the medicines. So the present study reveles the use of one of weed that is *Commellina benghalensis.* It belongs to family *commelinaceae*, which is widely distributed in India. Many of literature study states that there were no any sub - stantial work was carried out, on endophytic bacteria present in this plant species. Endophytes are nothing but microflora of plant. Each plant has its own endophytic flora, but they do not cause any disease are called endophytes. So, the efforts were made to investigate the isolation and characterization of endophytic bacteria present in dayflower of *Commelina benghalensis.* The endophytic analysis shows presence of *micrococcus species* in day flower of this plant.

Key words: *Commellina benghalensis,* Dayflower, endophytic bacteria, *micrococcus species*

P-II.10: COMPARISON OF *IN VITRO* CULTURE OF *OSBECKIA ASPERA* AND *O. RETICULATA*

Bosco Lawarence* and Murugan K
Department of Biotechnology & Botany, Govt. Arts College, Trivandrum, 695 014, Kerala
Email: boscotvm@gmail.com

The aim of this study was to develop micropropagation procedures for the heavily exploited and threatened *Osbeckia* species *Osbeckia aspera* and *O. reticulata* to facilitate conservation and reforestation. Both species are difficult to establish and grow in tissue culture because of their high phenolic content. A protocol for the establishment of explants *in vitro* was developed comprising decontamination, media and hormonal treatment. *Osbeckia aspera* and *O. reticulata* have been used in Indian ayurvedic medicine for the treatment of a wide number of health disorders. The present study deals with the influence of different plant growth regulators (PGR) including kinetin (Kin), 6- Benzyl aminopurine (BAP) and 2, 4-Dichlorophenoxyacetic acid (2,4-D) on the growth of plant. Nodal and leaf segments used as explants were cultured on Murashige and Skoog's medium (MS) supplied with different concentrations of PGRs. Multiple shoot generation was achieved after substantial days of incubation. The result concluded that various concentration of PGR had a significant role in *in vitro* regeneration of plant.

Keywords: Micropropagation, Nodal Explant, MS Medium, Kinetin, Medicinal, Benzyl aminopurine, *Osbeckia aspera* and *O. reticulata*

P-II.11: *AGROBACTERIUM TUMEFACIENS*- MEDIATED TRANSFORMATION OF *CISSAMPELOS PAREIRA* USING BINARY VECTOR PCAMBIA 1301 AND ACETOSYRINGONE AFFECTING ON TRANSIENT GUS EXPRESSION

C. M. Narendra Reddy, P.V. Chaithanya Lakshmi, and B Srinivas*
Department of Biotechnology, Dravidian University, Kuppam-517426, A.P, India
E-mail: bathulasrinivas71@gmail.com

Cissampelos pareira belongs to the family Menispermaceae commonly known as Adavibankateega in Telugu. It is commonly distributed throughout tropical and subtropical India. The plant is well known for its medicinal values and used to treat fever, anti-diabetic activity, urinary ailments, vaginal discharge, piles, and digestive system complaints. Also used in the treatment of chronic non-healing ulcers and sinuses. It is also used in treatment of chronic skin diseases and in the treatment of poisonous bites. In the present study, we developed a rapid and efficient method for Agrobacterium-mediated transformation of *C. pareira*. Nodal explants of *C.pareira* propagated on MS media supplemented with BAP (1mg/l) and NAA (0.5mg/l). The transformation was carried out in both nodal and leaf explants inoculated in liquid YEP media with A.tumefaciens EHA 105 containing $_{p}$CAMBIA 1301. The better response was shown in leaf explants when compared to nodal explants. Optimization of co-cultivation parameters resulted in high transformation efficiency at transient GUS expression. The transformation efficiency was increased 6-fold when infection was carried out with acetosyringone (50µM) in co-cultivation medium. Further, experiments like PCR being used to amplify *hpt* (hygromycin phosphotransferase) gene in transformed plant tissue and southern hybridization.

Keywords: *Cissampeles pareira, Agrobacterium tumefaciens,* Acetosyringone, GUS gene.

P-II.12: WOMEN EMPOWERMENT THROUGH MACROALGAL CULTIVATION FOR BIOETHANOL WITH THE VALUE ADDED PRODUCTS

Deepthi Hebbale[1, 2] and T.V. Ramachandra[1, 2,*]

[1]Energy and Wetlands Research Group, Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560012, Karnataka, India

[2]Centre for Sustainable Technologies, Indian Institute of Science, Bangalore 560012, Karnataka, India

** Corresponding author's E mail: tvr@iisc.ac.in; deepthih@iisc.ac.in*

Marine macroalgae are emerging as promising third generation feedstock for biofuel production. Many south eastern Asian countries have explored the potential of farming these macroalgal biomass in estuaries as well as in off shore aquaculture ponds. Macroalgal harvesting and pre-processing (70-80%) has been carried out by women farmers, paving way for young entrepreneurs through organization of self-help groups. India with its vast extent of coastal wetlands and paddy lands needs to explore seaweed cultivation, with the scope for sustainable livelihood empowering young women. However, naturally growing macroalgal biomass in *gazni* ponds in Aghanashini Estuary situated in Kumta Taluk, west coast of Karnataka, are being discarded due to lack of knowledge and also absence of appropriate market channels. This study explores the scope of macroalgal resource from *gazni* ponds for biofuel production with the commercially viable value-added products through market penetrations by enterprising youth. Seaweed is emerging as 'sea-wealth' evident from its potential as viable feedstock for biofuel and value added commercial products with the scope of transforming fortunes of women farmers from lower economic strata.

Keywords: Seaweed, macro algae, biofuel, bioethanol

P-II.13: GREEN SYNTHESIS OF ZINC OXIDE NANOPARTICLES: POTENTIAL APPLICATION AS NANOMEDICINE TO TREAT CANCER

Dhanashri Lole, Namarata Bhise, Dhanashri Gavali, Jayashri Chimanpure and Kalpna D. Chandramore*

Department of Biotechnology, Vidya Pratishthan's Arts, Science and Commerce College, Baramati, Dist. Pune- 413133

E-mail: kalp.chrandramore@gmail.com

Nano biotechnology has revolutionized the field of cancer diagnostics and treatment. Researchers have demonstrated significant reduction in fibroid by using nanogold particles conjugated with tumor necrosis factor alpha (TNF-á). Moreover, magnetic nanoparticles assisted gene therapy has seen to be significantly suppressed proliferation of cells of uterine fibroid. Considering the efficacy of those NPs, we have synthesized ZnO NP using Eco-friendly approach as green synthesis to treat the uterine fibroid. ZnO nanoparticles (NPs) are used in treatment of several cancer diseases. Several reports proved that ZnO NPs exhibit less side effects and better selectivity among normal and cancerous cells. Cell death caused by ZnO NPs is due to intracellular ROS generation which induces apoptosis or the autophagy signaling pathway (Zhang *et al.,* 2013).

In the present study, ZnO NPs are synthesized using *Acacia* leaves and flower extracts. Further, cytotoxic effect is evaluated on *Drosophila* and chicken embryos. We are aiming to use those ZnO NPs as Nano medicine to treat uterine fibroid.

Keywords: Zinc oxide nanoparticles, green synthesis, Nano medicine

P-II.14: AN INHIBITIVE ASSAY FOR THE DETECTION OF MERCURY AND COPPER BASED ON THE GINGER PROTEASE

Garba Uba[a,b,d*], Muntari Bala[d], Muhammad Mushidi Abdullah[a] Baskaran Gunasekaran[c], Mohd. Yunus Shukor[a]

[a]*Department of Biochemistry, Faculty of Biotechnology and Biomolecular Sciences, Universiti Putra Malaysia, UPM 43400 Serdang, Selangor, Malaysia*

[b]*Department of Science Laboratory Technology, Jigawa State Polytechnic, Dutse, PMB 7040 Dutse*

[c]*Faculty Of Applied Science, UCSI University, 56000 Kuala Lumpur,Selangor, Malaysia*

[d]*Department of Biochemistry, Faculty of Basic Medical Science, Bayero University, Kano, Nigeria*

E-mail: garbauba@jigpoly.edu.ng

Extreme industrialization poses a major threat to the security of water bodies. The presence of toxic substances chiefly heavy metals are being recorded at a shocking level. Their detection and monitoring require expensive and sophisticated instrumentations that need skilled personnel to operate, along assay time and the inability to detect heavy metals in real time. A heavy-metal assay has been developed using ginger protease. The enzyme is assayed using casein as a substrate with Coomassie dye to track completion of hydrolysis of casein. In the absence of inhibitors, casein is hydrolysed to completion, and the solution is brown. In the presence of metal ions such as $Hg2^{+}$ and Cu^{2+}, the hydrolysis of casein is inhibited, and the solution remains blue. Nonlinear regression of the inhibition curve gave concentration of metal giving 50% inhibition of enzyme activity (IC_{50}) for Hg^{2+} at 0.0852 mg/L (95% CI from 0.132 to 0.242) and Cu^{2+} at 0.042 mg/L (95% CI from 0.07690 to 0.2812). The IC_{50} values for these heavy metals are comparable to several other assays such as papain and bromelain assays, immobilized urease, 15-min Microtox™, and rainbow trout assays. The potential of this inhibitive assay for monitoring heavy metals in the environment is discussed.

Key words: Ginger protease, Inhibitive assay, coomasie blue, toxicity

P-II.15: IMPACT OF *CALOCYBE INDICA* EXTRACT ON COMMON PROBIOTICS

[1*]Gourav Dipta Banerjee, [1]Suchandrima Bhowmik, [1]Moitrayee Sarkar, [1]Anshu Shaw and [1]Suhana Datta

[1]Department of Microbiology, St. Xavier's College (Autonomous), Kolkata
Email: gouravdipta.banerjee@gmail.com

The present study aimed to investigate the prebiotic potential of aqueous crude polysaccharides (ACP) from an edible mushroom *Calocybe indica* to stimulate the growth of *Lactobacillus plantarum* and *Lactobacillus rhamnosus* as reference strains and *Lactobacillus lactis* isolated from curd. Polysaccharide fractions were evaluated by *in vitro* acid digestibility using artificial gastric juice treatment. Their proliferative effect and acid production of selected *Lactobacillus* sp. were investigated by growth curve assay and pH determination. Measured carbohydrate showed 90% resistance to artificial acid digestive at ph1 and 75% at ph5. Comparison against standard prebiotic, inulin and maltodextrin were done. Total carbohydrate content was found to be 20mg/100mg crude polysachharides and ß-glucan content was 1% of total carbohydrate. These studies show that mushroom's polysaccharide is a potential prebiotic.

Keywords: Polysaccharides, Probiotics, *Lactobacillus,* Inulin, Maltodextrin, Prebiotic, *Calocybe indica*

P-II.16: .EFFECT OF DROUGHT STRESS ON LIPID PEROXIDATION IN ONION (*ALLIUM CEPA* L.) SEEDLINGS

K. Riazunnisa

Department of Biotechnology and Bioinformatics, Yogi Vemana University, Kadapa, YSR District, Andhra Pradesh

E-mail: khateefriaz@gmail.com, krbtbi@yogivemanauniversity.ac.in

Seedling phase is a crucial period for survival, growth and development under drought stress. Lipid peroxidation under drought stress was investigated in seedlings of different onion cultivars namely Agrifound rose (AF), Bellary (BL), Prema-178 (PR), Nasik red (NR), Arka kirthaman (AK) and Arka lalima (AL). The experimental design was randomized entirely, with polyethylene glycol – 6000 i.e., 0, 25, 50, 75 and 100 g/l at different time intervals. AK, BL and AL were less affected by drought and with duration of stress. After 24 h of PEG treatment, level of lipid peroxidation was more in AF and NR. We observed that at 48 h, MDA amount reaches to control levels. Further studies are required to identify the tolerant variety.

Keywords: Drought stress, Lipid Peroxidation, PEG-6000, Onion, *Allium cepa* L.

P-II.17: OPTIMIZATION OF CELLULASE FROM *BACILLUS* SP AND THEIR APPLICATIONS IN PAPER INDUSTRIES

Kanagarajan Manimekalai[1], Vellingiri Manon Mani[2*], Sivaraj Barath[2] and Rajendran Gohila[1]

[1]Department of Biotechnology, Hindusthan College of Arts and Science, Coimbatore- 641028, TN, India

[2]Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Coimbatore- 641402, TN, India

**Corresponding author's E mail: manonmanisathee12@gmail.com*

The degradation of cellulose in the paper industries is the difficult process. In order to reduce the environmental pollution and also to ease up the cleaning process. In this current investigation, the cellulase enzyme was produced in mass and the optimization of the parameters were carried. The enzyme was produced from the Bacillus sp MB 1 and MB7 isolated from the campus of DFRL, Mysore. Different pH, temperature, incubation period carbon and nitrogen sources were assessed to determine the maximum production of cellulase. The optimization parameters were carried out in the laboratory scale and optimized medium was used for the production of the enzyme. The enzyme was purified through chromatographic techniques and determined for its purity by SDS PAGE.

Keywords: *Bacillus*, cellulose, optimization.

P-II.18: EVALUATION OF STORAGE STABILITY AND ANTIMICROBIAL ACTIVITY OF DRY SPICE MIX OF CHETTINADU ETHNIC CUISINE

R. Kasthuri Thilagam[*] and R.Saravana Kumar[**]
Department of Food Science, Imayam Institute of Agriculture and Technology, Thuraiyur
Department of Textile Science and Design, Community Science College and Research Institute, Tamil Nadu Agricultural University, Madurai
E mail: kasthuribabu82@gmail.com

The complete recipes of the Chettinadu ethnic cuisines were collected through snow ball sampling method from the house hold women at Karaikudi, Devakottai and Thirupathur blocks of Sivagangai District.among the recipes collected, a typical spices based Chettinadu ethnic cuisines *viz*., *Briyani mix* was standardized in the laboratory using several combinations of trails. The same quantity of masala and preparation procedure was followed for standardization of the recipe and finally scaling up was done. The prepared dry spice mix was packed in four different packages such as Low density polyethylene, High density polyethylene, Poly propylene and Metalized polyester low density polyethylene laminate pouches and stored at room temperature for 180 days. The storage stability of dry spice mix was analysed once in 30 days. All the chemical constituents such as moisture, protein, fibre, fat, calcium, phosphorus and iron were found to be gradually reduced throughout the storage period. The sensory characteristics of the ethnic cuisine prepared from dry spice mix was organoleptically evaluated using 9.0 hedonic scale before and after storage and were found to be good. The antimicrobial activity of *chicken briyani* mix against the food borne pathogens, such as *Listeria monocytogenes* MTCC 1143, *Staphylococcus aureus* MTCC 1144, *Bacillus cereus* MTCC 1272 and *Escherichia coli* MTCC 2622 were analysed before and after storage. The inhibition extract of dry spice mix of *chicken briyani* inhibited against *Listeria monocytogenes* MTCC 1143, *Staphylococcus aureus* MTCC 1144, *Listeria monocytogenes* MTCC 1143 before storage and but the inhibition extract failed to show positive antimicrobial activity after 6 months of storage.

Key words: Storage stability, ethnic cuisines, Dry spice mixes, Anti-microbial activity, Food borne pathogens, Packaging materials

P-II.19: TRANSIENT EXPRESSION STUDIES OF *Bm*NPV ANTIVIRAL PROTEINS SERINE PROTEASE AND LIPASE IN MULBERRY PLANT

Lakshmeesha, R. and Nagesha, N.
Email: laskshmeeshar123@gmail.com

Silkworm Bomyx mori L. is being commercially utilized for the production of silk. Bombyx mori nuclear polyhedrosis virus (BmNPV) causes Grasserie a viral disease in silkworm which is a major disease causing great economic loss to sericulture industry. The present investigation lays main emphasis on transformation of antiviral genes, serine protease and lipase into mulberry leaves using agro infiltration. BmNPV antiviral proteins were expressed in the plant expression vector pBI121. The plant expression vector pBI121 was successfully moved into *Agro-bacterium* cells for agro infiltration studies in mulberry. The gene integration and expression of antiviral proteins were confirmed by PCR amplification and SDS-PAGE analysis. The antiviral protein genes were cloned into bacterial expression vector pET32a for bioassay studies.

Keywords: Bombyx mori nuclear polyhedrosis virus, Grasserie, *Bombyx mori* lipase, Bombyx mori serine protease

P-II.21: NUTRITIONAL SINK FORMATION IN GALLS OF *MILLETTIA PINNATA* SYNERGISTICALLY INFECTED BY *MYRICOMYIA PONGAMIAE* AND *ERIOPHYES CHERIANI*

Myrene R. D
Department of Biochemistry, Mount Carmel College, No. 58, Palace Road, Vasanthnagar, Bangalore, India 560052, India
*E mail: *myrene83@gmail.com*

Investigation of source-sink relationships between insects and plants often invoke exploration of nutrition, environment and enemy hypotheses. Insect galls, galled and healthy leaves of *Millettia pinnata* infested synergistically by *Myricomyia pongamiae* and *Eriophyes cheriani* were analyzed. There is mobilization of water-soluble carbohydrates, total soluble sugars, starch, and proteins into gall from the ungalled region of leaves. Higher concentrations of total and ortho-dihydric phenols were reported in galled leaves. Stress biomarkers-H_2O_2, malondialdehyde and proline were higher in galled leaf. Reduced glutathione declined in infected leaves. Catalase, peroxidase and glutathione reductase possessed higher activities in galls and galled leaf than healthy leaf.

Keywords: Nutritional sink, galls, *Millettia pinnata,* phenolics, antioxidant, biotic stress.

P-II.22: *SCIRTOTHRIPS DORSALIS* (HOOD): A FACILITATOR OF TOBACCO STREAK VIRUS OUTBREAK IN COTTON ECOSYSTEM

M. Shanmuga Prema
Department of Agricultural Entomology, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu –641301, India
E-mail: prema.ms1990@gmail.com

Scirtothrips dorsalis, the predominant thrips population in cotton ecosystem, plays major role in Tobacco streak virus (TSV) transmission. qRT-PCR confirmed the presence of TSV within 2nd instars and adult thrips after 72h of AAP. However, viruliferous instars and adults failed to transmit the virus after 72h of IAP on test plants. When *S.dorsalis* observed under SEM, *Parthenium* pollengrains were found adhering to its body. TSV was detected in leaf and pollengrains of symptom-free *Parthenium* plants. Transmission studies resulted in symptom expression on cotton plants (ANKUR2110) after 25DPI when treated TSV inoculated Parthenium pollengrains and thrips (viruliferous/aviruliferous).

Keywords: Tobacco streak virus, *Scirtothrips dorsalis, Parthenium hysterophorus*

P-II.23: ISOLATION AND IDENTIFICATION OF VARIOUS FUNGUS SPECIES FROM PICHAVARM COASTAL AREA IN TAMIL NADU

Palanimuthu Duraisamy and Vasanthi Nachiappan
Bio-membrane Lab, Department of Biochemistry, Bharathidasan University-620024, Tamil Nadu, India
E mail: mypublication2014@gmail.com

Marine fungi are species of fungi that live in a marine or estuarine environment. Facultative marine fungi normally occupy terrestrial or freshwater habitat but are capable of living or even speculating in marine habitat. The present study is carried out the isolation and identification of various fungus species from the mangroves soil sediment and freshwater sampling. The samples were collected from the pitchavam cam coastal area is Chidambaram in Tamil Nadu. There are four species were collected the sample, collectively two upper regions and two lower regions of mangroves in the marine ecosystem. In my contribution to this study were exactly collected the soil and freshwater samples. The higher ratio of ***Aspergillus fumigates, Aspergillus Niger, Aspergillus flavus, Aspergillus terreus*** in water compared with a mangroves soil sample. Isolation of fungal used by the culture plate method, culture media is potato dextrose agar (PDA), and Sabouraud dextrose agar (SDA). The marine funguses contain a growth condition of in vitro model the pH level is 5.6 and incubation of 27ºC for 7-14 days. The culture was after five days is well young growth of specific morphology can be identified fatherly, LBCP stained by the young species sampled followed by the microscopic examination. The species are anatomically and morphologically confirmed that. Fatherly, studies will be species are the analysis of biochemical and molecular assays. The future study is the biological activity of antioxidant antibiotic activity and anticancer property; particularly in oral cancer therapeutic drugs are isolated from the mangrove soil sediment. The various fungus species are widely sourced of the anti-therapeutic potential in marine source ecosystem in our country.

Keywords: Mangroves, *Aspergillus niger, A. flavus*, SDA, PDA, LBCP

P-II.24: CURRENT PERSPECTIVES AND STRATEGIES FOR FUTURE DEVELOPMENT OF ORGANIC FARMING

Panjulakshmi Murugan and Jennifer Aloysius John
Rathnavel Subramaniam College of Arts and Science, Sulur-64l 402, Tamil Nadu, India
Corresponding author's mail: jennifer@rvsgroup.com

This paper focuses on the present status and prospects of organic farming in India. India is endowed with various types of naturally available organic form of nutrients in different parts of the country and it will help for organic cultivation of crops sustainable .An attempt is made to analyze the importance of organic farming, principle of organic farming, objectives of organic farming, advantages and disadvantages of organic farming, Marketing and export of organically produced products in India .Organic foods and beverages are a rapidly growing market segment in the global food industry .Organic agricultural systems deliver greater ecosystem services and social benefits. Conventional farming in the face of the Green-revolution system allows the agricultural production capacity.

Keywords: Conventional farming, Biodiversity, Bio-control, scientific innovations, Eco-friendly system

P-II.25: QUALITATIVE AND QUANTITATIVE PHYTOCHEMICAL ANALYSIS OF MEDICINAL PLANT *CAPPARIS ZEYLANICA LINN.* OCCURRING IN VIDARBHA REGION

Prachi G. Holkar
Department of Biochemistry, Shri Shivaji College of Art, Commerce & Science, Akola (MS)
Email:prachiholkar97@gmail.com

Medicinal plants have bioactive compounds which are used for curing of various human diseases.The present study involves medicinal plants *Capparis zeylanica* L. locally available in Vidarbha region of Maharashtra. The main objective of the research work was to check the presence or absence of the phytochemical constituents in the selected medicinal plants.

The phytochemical analysis of the plants is very important commercially and has great interest in pharmaceutical companies for the production of the new drugs for curing of various diseases. It is expected that the important phytochemical properties recognized by our study will be very useful in curing of various diseases.

Keywords: Medicinal plant, phytochemical analysis, *Capparis zeylanica* L. etc.

P-II.26: PRODUCTION AND ANALYSIS OF BIO ENZYMES OBTAINED AFTER FERMENTATION OF FRUIT PEELS

Pragati Mohite[1], R.K.Bhadekar[2] and Rajesh Sharma*
Department of Biotechnology, Vidya Pratishthan's Arts, Science and Commerce College, Baramati, Dist. Pune – 413133
E-mail: rajesh_vpascc@gmail.com

BIOENZYME is a multipurpose, natural cleaner produced from vegetable/fruit peels (usually citrus) or waste. It is an effective alternative to harsh chemicals such as bleach, phenyl and other chemical solutions. Chemically, the Bio enzymes are a mixture of complex organic substance such as proteins, salts and other materials that are by-products of fermentation. By understanding the above concepts and mechanisms, the present study was carried out for production and analysis of bio enzymes from orange and sweet lime peels. During fermentation, the enzyme produced like cellulose, amylase, protease, lactase and lipase were tested for its activity in fermented broth at different period of fermentation and found with moderate level of activity. The organic substances present in the bio enzyme helps in expanding the area of their applications ranging from bathroom cleaners, skin care products and fertilizer. **Keywords:** Fruit waste, fermentation, enzymes, waste management, bio cleaners.

P-II.27: *IN VITRO* REGENERATION OF *"CITRUS SINENSIS"* BY USING A NODAL SEGMENT

Priyanka S.Gote
Department of Plant Biotechnology, Shri Shivaji College of Agriculture Biotechnology, Amravati
Email: priyankagote9@gmail.com

In the present study "*in vitro* regeneration of *citrus sinensis* (Sweet orange)".The explants were culture on MS media with respect to different plant growth Regulator to check the nodal segment potential to grown into number of multiple Shoots. Various type of growth hormone such as BAP,NAA,IBA, and Kinetin were used for culturing of explants either in combination or alone at different hormonal Concentration .the explants inoculated on different hormonal concentration with different combination .the explants shows variation in shoot induction and development. So that some combination suited for inducing number of shoot. These combinations described efficient rapid micro propagation of *citrus sinensis.*

Keywords: *Citrus sinensis,* In-vitro, Explant, Callus, BAP & IBA

P-II.28: ISOLATION AND SCREENING OF HIGH ETHANOL TOLERANT YEAST STRAIN FOR PRODUCTION OF ETHANOL FROM SUGARCANE JUICE AND SORGHUM PLANT EXTRACT

Raghu, P. R., Harinikumar, K. M.[2], Manojkumar, H. B., Ramesh, U. M. and Lakshmeesha, R.

[2]Dept. of Biotechnology, University of Agricultural Sciences, Bengaluru 500065, India
E-mail: harinikumarkm@gmail.com

The investigation was carried out to isolate yeast strains from their natural habitats and to screen them for ethanol tolerance and ethanol production. A total of 45 yeast strains were isolated from sugarcane juice, sorghum plant extract and other sugar rich samples. Eighteen were identified as *Saccharomyces* strains based on colony type and cell morphological characters and budding characters. *Saccharomyces* species were screened for the ability to tolerate different ethanol concentrations from 6-14.5%. Yeast strains showed tolerance level from 6-13.5%. Strain YEF3, which showed high tolerance (13.5%) to ethanol stress. Random Amplified Polymorphic DNA (RAPD) analysis was employed to characterize yeast isolates. Eighteen *Saccharomyces* strains were subjected to RAPD analysis using ten primers, selected from the kits of Chromous Biotech. From the total of 163 scorable bands, 120(73.61%) were polymorphic. Dendrogram was constructed according to Ward's method using Statistical software. Cluster analysis revealed major two major groups. Eight strains formed one group and other seven strains formed other group.

Key words: Yeast strain, Ethanol tolerance, RAPD.

P-II.29: ANTIBACTERIAL AND ANTIFUNGAL ACTIVITY FROM LEAVES OF *SCOLOPIA CRENATA* (WIGHT & ARN.) CLOS. (FLACOURTIACEAE)–NATURE'S GIFT TO MANKIND

Rajkumar Gomathi[1]*, Sellamuthu Manian[1]
[1]Department of Botany, School of Life Sciences, Bharathiar University, Coimbatore – 641 046, Tamil Nadu, India
**Department of Botany, Sri Sarada College for Women (Autonomous), Affiliated to Periyar University, Salem – 636 016, Tamil Nadu, India*
Email: gomathiraj.85@gmail.com

Scolopia crenata (Wight & Arn.) Clos., belonging to Flacourtiaceae is an endemic tree to southern India with varied ethnomedicinal usage. The present study was undertaken to evaluate the antibacterial and antifungal potential of various solvent extracts from leaves of

S. crenata against selected human pathogenic microorganisms. Overall, the tested samples demonstrated varying inhibitory potencies in terms of zone of inhibition that varied between 7.0 and 20.8 mm at a concentration of 500 µg. Besides, *Bacillus cereus* was more sensitive to leaf methanol extracts exhibiting MIC 75-125 µg/ml. The results reflect the potential of methanol extracts from leaves of *S. crenata* as a candidature for antimicrobial drug with possible application in pharmaceutical industry.

Keywords: *Scolopia crenata*, Flacourtiaceae, antibacterial, antifungal, MIC

P-II.30: ENGINEERING OILSEED PLANTS FOR HIGH VALUE POLYUNSATURATED FATTY ACIDS PRODUCTION USING NOVEL GENES FROM MICROALGAE

M. Ram Kumar, S. Thiyagarajan, and S. Kathiresan*
Department of Molecular Biology, School of Biological Sciences,
Madurai Kamaraj University, Madurai – 625021, Tamilnadu.
E-mail: kskathir@gmail.com

High value polyunsaturated fatty acids (HVPUFAs) contain 18 or more carbon atoms with two or more double bonds that are classified as omega (ù) 3 and 6 fatty acids. These fatty acids possess several health benefits in human growth and development, particularly in brain development and cardiovascular protection. Humans can able to synthesize these PUFAs from essential fatty acids present in the diet. In the recent decades, the western food habit in human reduces the conversion efficiency of these PUFAs that leads to several metabolic disorders. To overcome this problem, direct supplementation of these fatty acids is essential. Since the land based oilseed crop plants cannot synthesize these HVPUFAs due to lack of specific genes, it can be possible if these genes are incorporated into oilseed crop plants to extend the pathways. As marine microalgae are the primary producers, the specific genes are available in one of the microalga *Isochrysis* sp that has been functionally well characterized. Here, the present study focus on the influence of one such gene, "6 Desaturase ("*6Des*) from *Isochrysis* sp on model plant, *Arabidopsis thaliana* and the possible production of HVPUFAs by extending the PUFA metabolic pathway in oilseed crop has been described.

Keywords: *Isochrysis sp, "6Des, Arabidopsis thaliana,* HVPUFA.

P-II.31: EFFECT OF DPJ OBTAINED FROM VARIOUS PRESERVED LEAF JUICE SAMPLES ON GROWTH OF *Fusarium oxysporum*

Salve U. S., Kamble S. V. & Sirsat P. B.
Department of Botany, Swa. Sawarkar Mahavidyalaya, Beed-431122 (M. S.)
Dept. of Botany, Arts, Commerce & Science College, Pimpalner, Dist- Beed (M. S.)
Dept. of Zoology, Mrs. K. S. K. College, Beed- 431122 (M. S.)
E mail - uttamssalve@gmail.com

Attempts have been made during present investigation to point out effect of the deproteinized juice (DPJ) obtained from various six plant species preserved leaf juice samples on growth of *Fusarium oxysporum.* The deproteinized juice (DPJ), left after isolation of leaf protein concentrate (LPC) was employed for the cultivation of fungi. The results show growth of fungi on DPJ. It indicates that the DPJ is an ideal medium for growing fungi. The favorable growth of fungi is observed on the DPJ expressed from the stored juice. The DPJ obtained from stored leaf juice are more suitable for the growth of fungi.

Key words: Spinach, Cauliflower, Fenugreek, Cabbage, Coriander, Lucerne, Leaf Juice, Mycelium, Fusarium, DPJ

P-II.32: USE OF MICROSATELLITE MARKERS FOR GENETIC PURITY TESTING OF MAIZE (*ZEA MAYS* L.) F1 HYBRID

V. Satya Srii, N. Nethra[1], P.J. Devaraju[2], H.C. Lohitashwa[3] and T.M. Ramanappa[4]

[1]STR, NSP, GKVK, Bengaluru
[2]Department of Seed Science and Technology, CoA, GKVK, Bengaluru
[3]Department of crop improvement, CoA, Mandya
[4]BSP, NSP, GKVK, Bengaluru
E mail: sriinila@gmail.com

Genetic purity of parental lines and hybrids is of crucial i mportance, as it helps in successful hybrid seed production. Also maize being allogamous crop, the maximum exploitation of hybrid potential is possible only with supply of genetically pure seeds. Application of molecular markers for genetic purity testing is used widely owing to time consuming and irreproducible results of conventional methods. In this study 25 SSR markers were used for screening maize hybrids MAH-14-5 and Hema. Of the 25 SSR markers studied, 7 pair of primers showed polymorphism while 18 showed monomorphism. SSR analysis resulted in identification of two markers *i.e.* Bnlg 1520 and Umc 1288 and three markers *i.e.* Phi 053, Bnlg 1621 and Bnlg 1014 showing unique polymorphism for MAH-14-5 and Hema respectively, while two *i.e.* Bnlg 1185 and Umc 1594 showed common polymorphism to both Hema and MAH-14-5. Hema seed lot tested with identified SSR markers resulted in genetic purity of 88 per cent. Thus the identified polymorphic markers can be used for commercial hybrid seed lot testing in future.

Keywords: Off types, polymorphism, SSR, Maize.

P-II.33: MOLECULAR EVOLUTION AND *IN-SILICO* ANALYSIS OF PLANT POLYAMINE OXIDASES

Shashidhara KS and MSP Kanavi
Department of Genetics and Plant Breeding, College of Agriculture, Karekere, Hassan-573225, Karnataka, India
E mail: shashi2k4@gmail.com

Full length amino acid sequences of 46 Polyamino oxidases (PAO) and 8 Diamino oxidases (DAO) were retrieved from sequence repositories. PAOs belongs to 21 and DAOs to 5 families. Multiple sequence alignment of amino-acid sequences identified conserved residues Glycine, Glutamic acid, Alanine, Arginine, Tryptophan, Proline, Valine, Leucine, Phenylalanine, Tyrosine & Lysine and Glycine is most conserved. Phylogenetic analysis revealed three main clades A, B and C. PAO and DAO genes of plants, *Arabidopsis thaliana*, *Brachipodium*, *Glycin max*, *Oryza sativa* present on different chromosomes. Comparative modeling done to build 3D structure of amino oxidases. Ramachandran plot showed more than 90% residues in most allowed regions.

Key words: Amino Oxidases, molecular evolution, Phylogeny, 3D structure, Cellular localization

P-II.34: PHYSIOLOGICAL ASPECTS OF COLD STRESS ADAPTATION IN *PICRORHIZA KURROA*

Shreya Agrawal[1#] and Pooja Saklani[1]

[1]Dept. of Zoology and Biotechnology, HNB Garhwal University, Srinagar Garhwal- 246174, Uttarakhand, India

[#]Corresponding Author Email: ashreya.sa.sa@gmail.com

Cold stress adversely affects the plant growth and can lead to its death. There are multiple plants in temperate region which are cold stress tolerant. *Picrorhiza kurroa* is one such herb, which grows in alpine and sub- alpine regions and survive the cold stress. To evaluate the effect of altitude on the physiological characteristics of *P. kurroa*, we measured stress enzymes' activities and osmoprotectants. The leaves were collected from two different altitudes in Pothivasa and Tungnath, Uttarakhand, India. There is an increase in stress enzymes' activity and osmoprotectants, hence suggesting the adaptation mechanism and survival strategies of *P. kurroa*.

Keywords: Cold stress, *Picrorhiza kurroa*, Uttarakhand, Western Himalaya

P-II.35: FREE RADICAL SCAVENGING ACTIVITY AND GC MS ANALYSIS OF *OCIMUM SANCTUM:* A STUDY WITH RESPECT TO PHARMACOLOGICAL APPROACH

K. R. Shanmugam [2]* M. Siva[1], G. Venkata Subbaiah[2] K. Sathyavelu Reddy [2]
[1]Division of Molecular Biology and Ethanopharmacology, Department of Zoology, Sri Venkateswara University, Tirupati – 517 502, India
[2] Department of Zoology, T.R.R. Government Degree College, Kandukur, A.P
Corresponding author's e mail: drshanmugam2016@gmail.com

Plants served the mankind as sources of theraupetic agents, since the dawn of civilization. The present study was carried out to know the free radical scavenging activity DPPH, H_2O_2, hydroxyl radical, GC-MS analysis and phytochemical screening of *Ocimum sanctum* (OS). DPPH, H_2O_2 and hydroxyl radical of OS showed potent free radical scavenging activities. GC – MS analysis showed the presence of many bioactive compounds like 2H-Pyan-2-one, 5,6-Dihydro-4-(2-methyl-3-methylene-1-buten-4-yl, Tricyclo[6.3.3.0] tetradec-4-ene, etc etc in the methanolic extract of OS. The phytochemical analysis also revealed the presence of many phytochemicals alkaloids, tannins, saponins, phenols, resins, flavonoids in OS. These bioactive compounds and phytochemicals will have many pharmacological properties. Our results suggest that OS has promising antioxidant activity and could serve as potential source of natural antioxidant and can be used as theraupetic agent against many diseases.

Keywords: Ocimum sanctum, free radical scavenging activity, GC-MS analysis, phytochemicals

P-II.36: CHELANT AIDED PHYTOREMEDIATION OF HEXAVALENT CHROMIUMPOLLUTED SOIL

Subha Priya V*, Kannan P, Ihsan Muzammil J, Balaselvakumar S and Nagarajan S

Department of Biotechnology, Rathnavel Subramaniam College of Arts and Science, Sulur, Coimbatore, Tamilnadu, India

**Corresponding author's E mail- subhavenkateshwaran@gmail.com*

Industrialization and urbanization have brought tremendous changes in the environment, the worst part being pollution. Pollution by heavy metals has gained much importance due to the non-biodegradable nature of these compounds. Hexavalent chromium is a major pollutant which can cause environmental as well as health hazards. Phytoremediation is one of the promising technologies to remove the pollutants in a safe manner. Plants are capable of accumulating the pollutants to a certain level that can be distributed to various parts, which is solely dependent upon the plant type and environmental conditions. Studies suggest that the uptake and translocation of heavy metals by plants can be enhanced with the aid of chelants. The present study aims to phytoremediate hexavalent chromium polluted soil employing *Talinum triangulare* under the influence of a synthetic chelant, EDTA and an organic chelant, Citric acid. The effects of chelant treatment on soil enzymes such as amylase, cellulose and invertase were assessed. The response of plants to the above treatment was monitored by assessing the plant growth and biochemical parameters. Accumulation of chromium and modification of various functional groups upon chelant treatment were studied. All the results were statistically analyzed and recorded. It has been noticed that soil treated with chelants was much effective to phytoremediation compared to the untreated samples. The study gives a clear idea about the usage of chelants for phytoremediation and also the role of citric acid in such purposes.

Key words: Phytoremediation, hexavalent chromium, EDTA, Citric acid, Chelants.

P-II.37: STUDIES ON THE IMPACT OF FERTILIZER INDUSTRY EFFLUENTS ON THE STRESS RESPONSES TO A STINGING CAT FISH, HETEROPNEUSTES FOSSILIS (BLOCH, 1974)

Upma Singh[a] and Ravi S. Pandey[*a]

Biochemistry Laboratory, Department of Zoology, University of Allahabad, Allahabad - 211002

E mail: upmasingh325@gmail.com

Industrial effluents released to the aquatic system are one of the major sources of environmental pollution. The aim of the present study was to assess the impact of fertilizer industry effluents on stinging cat fish, *Heteropneustes fossilis*. Fish were exposed to treated and untreated effluent (i.e. 1/15th, 1/10th and 1/5th of LC_{50}) for 96 h. A significant decline in SOD, CAT, GST, GSH activity and increase in LPO level was observed; however non significant alteration was recorded in treated effluent. Furthermore, untreated industrial effluent has potent oxidative stress inducers which may adversely affect the well-being of aquatic organisms like fish.

Keywords: Fertilizer, Industry effluent, *Heteropneustes fossilis*, SOD, CAT, GST, GSH and LPO

P-II.38: STUDY AND DEVELOPMENT OF WEANING FOOD FORMULATION PREPARED FROM GERMINATED GRAINS

Vanshika D. Padiya
Department of Biochemistry, Shri Shivaji College of Arts, Commerce and Science, Akola
Email: vanshikapadiya1998@gmail.com

The presented study represents the developing method of weaning food.The activity of salivary amaylase start to develop after 2-3 months of age and the infant becomes ready to digest complex starch and proteins up to 4-6 month of age.The raw materials used in the formulation are nutritionally rich specially finger mallet and moth bean . Use of malt in weaning food improved functional characteristics and high nutritive value. It contains amino acids, iron, calcium, vitamins and minerals in large amount. Two formulation f1 and f2 were prepared and studied in comparison to branded product i.e. Cerelac. In f1 formulation to increase protein content, the kilning process was replaced by sun –drying and moth bean also added in it. This formulation gives maximum benefits and itself is unique in nature because it's easily preferable at home recipe and economically cheaper.

Keywords: Sorghum, finger mallet, moth bean, malt

P-II.39: MAPPING AND INTERPRETATION OF REPETITIVE INGREDIENTS IN *VITIS VINIFERA* (GRAPES)

Virendra Kumar* and A. K. Jaitly
Department of Plant Science, Mahatma Jyotiba Phule Rohilkhand University, Bareilly, India
*E-mail: *virenmtech@gmail.com*

Repetitive sequences are ubiquitous segments of plants genome. The occurrence of repetitive sequences within the noncoding or coding region of DNA probably encouraging changes in the overall structure of a functional genome that makes them an emerging and very influential objects. Last decayed research shows the adverse impact of repetitive elements rises on genome organization during harsh environmental exposure. Therefore, for the better judgment of transposable elements role, The magnitude of their dispersion in the grape genome by the computational approach has been analyzed. The analysis revealed more than forty percent genome of *Vitis vinifera* comprises a total 3,79,530 copies of different superfamilies transposable elements. The TEs copies also distinguished according to their status in plant genome whether they are truncated or intact on both ends. The 680 copies of Copia and 933 copies of Harbinger superfamily elements are completely inserted (intact on both ends) and the remaining element copies partially inserted (i.e intact on one and truncated on other end or truncated on both ends) in *Vitis vinifera* genome. Out of 379530 copies of transposable elements, 13290 copies present in gene sequences and however 9042 copies present in promoter regions of different genes. The work may garner the evidence to understand the impact of repetitive elements on grapes which would be beneficial for fruiting tree genomics.

Keywords: Repetitive elements, Dispersion, Simple Sequence Repeats, Transposable elements, Copies.

P-II.40: PRELIMINARY SCREENING AND QUANTITATIVE ANALYSIS OF PHYTOCHEMICALS AND ANTIOXIDANT ACTIVITY OF *CHONEMORPHA GRANDIFLORA*

Ambujakshi N P and Raveesha H R
Department of Botany, Bangalore University, Bengaluru - 560 056
Email: hrraveesh74@gmail.com, ambujanp@gmail.com

Chonemorpha grandiflora is an important medicinal plant belongs to the family Apocynaceae. The present study was to design the effective protocol for the induction of callus and to evaluate the phytochemical and antioxidant activity. Stem explants of *C. grandiflora* were inoculated on B5 medium supplemented with 2, 4-D (2mg/L) and BAP (0.5mg/L) to obtain the profused callus. Preliminary phytochemical screening was done in root, stem, bark, leaf and callus extracts using standard procedures. The methanolic extracts of leaf showed the high amount of total phenols, flavonoids and tannins. Whereas total alkaloids, total antioxidant activity and DPPH radical scavenging activity was higher in stem. This study can be concluded that potential source of antioxidant phytochemicals were present in the plant.

Keywords: *Chonemorpha grandiflora*, phytochemicals, DPPH, B5

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