

# **Proceedings**

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# INVITED LECTURES

## Invited Lecture-1

### Neuroendocrine - immune interactions in stress

K. P. Joy

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Cochin University of Science and Technology, Kochi-682022

The term “stress” was first used by Walter Cannon in 1926 to external factors that disrupted what he called homeostasis. Stress involves multiple body systems and functions, affecting the equilibrium, if not corrected, and leads to psychological and pathological consequences. The major stress pathways include the nervous system, endocrine system and immune system, with intricate interactions among these systems. Hypothalamus–pituitary–adrenal (HPA) and sympatho–adrenomedullary (SAM) axes are the two major pathways through which immune functions are altered in all vertebrates, fish to mammals. Different animal models have been used to study stress physiology. Teleost fishes are unique in that the embryonic pronephric head kidney (HK) is retained in adults and it encompasses a major endocrine and immune tissues. Therefore, it is an ideal tissue model for the study of endocrine-immune interactions. The HK contains the adreno-cortical homolog (interrenal tissue) that secretes glucocorticoids (cortisol) and the medullary homolog (chromaffin tissue) that secretes catecholamines (Norepinephrine, NE and Epinephrine, EPI). The immune hemopoietic tissue (HT) consists of macrophages, granulocytes, erythrocytes, neutrophils and basophils. Melano-macrophages (pigmented macrophages) occur in groups (centres) or singly in the HT, as in other lympho-myeloid tissues. Macrophages secrete pro-inflammatory cytokines like Interleukins (IL-1 $\beta$ , IL-6 $\beta$ ) and tumor necrosis factor- $\alpha$ . Fish subjected to confinement (crowding) stress or lipopolysaccharide (LPS; bacterial toxin, immunostimulant) treatment activates HPA and SAM axes, as judged from elevated levels of cortisol, and NE and EPI. Macrophage-enriched HK preparations were used for *in vitro* investigation of endocrine-immune interactions. LPS stimulated phagocytosis, and nitric oxide (NO) and IL-6 $\beta$  levels, which was inhibited by dexamethasone, a cortisol agonist. NE and EPI inhibited the LPS-induced stimulation of NO and IL-6 $\beta$  levels. In summary, the HK macrophages respond to activation of the HPA and SAM axes, which suppress the immune responses.

## **Invited lecture-2**

### **Human herpesvirus-8 infected endothelial cells exhibit molecular features of neurons**

**Dr. Mohanan V Veettil**

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Viruses that infect and replicate mainly in immunocompromised host confront several molecular and biological challenges. The host range of such viruses is very limited and they might have evolved a way to protect the host by activating certain signaling pathways that could slow down the cellular activities while maintaining the successful survival in the host. Human herpesvirus-8 (HHV-8) or Kaposi's sarcoma-associated herpesvirus (KSHV) is an oncogenic herpesvirus which mostly infects immunocompromised patients, and the infection is marked by the formation of cancers such as Kaposi's sarcoma, primary effusion lymphoma and multicentric Castleman's disease. Our study provides the evidence that HHV-8 infection triggers the expression of inhibitory neuropeptide receptors that are responsible for regulating proliferation and for the indolent nature of the infected tumor cells.

### Invited Lecture-3

## Animal Tissue Culture

**Dr. Radha Palaniswamy**

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Cell culture has become one of the major tools used in the life science today. Tissue culture is a general term for the removal of cells, tissues or organs from an animal or plant and their subsequent placement into an artificial environment conducive to grow.

The culture of whole organs or intact organ fragment or development is called organ culture. Although animal cell culture was first successfully undertaken by Ross Harrison in 1907 it was not until late 1940s to early 1950s that development occurred that made cell culture widely available as a tool for scientists.

The two main types of cell cultures are primary culture and continuous culture. The primary culture is when the cells are surgically removed from an organ and placed into suitable culture environment, they will attach, divide and grow well which is called as primary culture. Secondary culture is when a primary culture is subcultured.

Irrespective of primary or secondary culture, they need to be subcultured at regular intervals. Subculture we mean, when the cells in primary culture vessel have grown and filled up all available space they must be subcultured to give them room for continuous growth. The surplus cells can be cryopreserved using protective agents like DMSO (diethyl sulfoxide) or glycerol stored at  $-130^{\circ}\text{C}$  to  $-196^{\circ}\text{C}$ .

Cell Line: A cell line or cell strain may be finite or continuous depending upon whether it has limited culture life span or it is immortal in culture. On the basis of the life span of culture, the cell lines are categorized into two types: Finite cell lines - The cell lines which have a limited life span and go through a limited number of cell generations (usually 20-80 population doublings) are known as finite cell lines. These cell lines exhibit the property of contact inhibition, density limitation and anchorage dependence. The growth rate is slow and doubling time is around 24-96 hours. Continuous cell lines - Cell lines transformed under laboratory conditions or *in vitro* culture conditions give rise to continuous cell lines. These cell lines show the property of absence of contact inhibition and anchorage dependence.

The cells can be borrowed or purchased from nonprofit organizations like ATCC (American Type Cell Culture). It is an alternative to establish cultures by primary culture by purchasing for nominal prices. Else, the other alternative is can borrow cell lines or cultured cells from any authenticated research labs or academic institutions.

The cell culture system has two basic culture systems used for growing cells which is to either attach or grow on a treated plastic or glass substrate as a monolayer or floating cells

free in culture medium called as suspension culture system. Monolayer culture is grown in treated dishes, T flasks, roller bottles, multiwall plates etc. Suspension culture is grown in magnetically rotated spinner flasks where the cells are actively suspended in medium. The cells may be anchorage dependent (as they can only grow either attached to a suitable substrate) or anchorage independent cells.

The applications of animal tissue culture cover a large spectrum ranging from production of vaccines, monoclonal antibodies, drug targeting, diagnostics and research. Devastating diseases can be prevented by research being carried out currently in the field of cell culture and also to understand clearly the role of cells and its components, cell-cell interaction, and much more.

However, it has gained lot of popularity and paramount importance due to the 3 R's which stands for replacement, reduction and refinement. It implies that animal sacrifice has been replaced by cell lines as replacement and reduction they meant in the number of animals to be sacrificed. Refinement is the finery of the work by reducing pain and suffering to the animals. By this we are able to install ethics in our research.

## PAPER PRESENTATIONS

### PP 1

#### **Molecular characterisation of *bacillus* sps. having ability to utilize leachate**

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Solid waste is an important environmental problem in both developing and developed countries. Landfill leachate is defined as an aqueous effluent produced when water percolates through the waste in a landfill. The nature of landfill leachate depends on the type of municipal solid waste being dumped, landfill age, moisture content, seasonal weather variations, site hydrology, the stage of decomposition in the landfill and pH. The present investigation was designed to isolate bacteria from garden soil and was identified by means of morphological, cultural and some biochemical characterizations. The proteolytic, lipolytic and amylolytic properties of the bacterial isolates were evaluated. Qualitative analysis of certain components of leachate, such as starch, lipid, and protein were carried out. This work was also undertaken to detect the molecular characterization of *Bacillus* sps. isolated from garden soil which had well known ability to consume leachate by using universal primers 5'AGTTGATCCTGGCTCA3' and 5' ACCTTGTTACGACTT3'.

### PP 2

#### **Desamoolanavaneetham for treatment of autism, a case report**

**Anju T R**

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Autism spectrum disorder is characterised by significant social communication deficits/delays along with restricted patterns of interests and behaviours. The prevalence of autism has increased over the past few decades, and it is unclear whether this is solely attributable to the increased awareness of milder forms of the disorder among medical providers. The current treatment options for autism are limited and children and adolescents with autism spectrum disorder appear to be more susceptible to adverse effects with medications. Hence, alternative treatments modalities have been researched as possible treatments in autism. We here report the case study of a child with autism, whose symptoms were markedly decreased after taking oral medication of Desamoolanavaneetham (Ref: Astanga Hridaya, page 44) 5 g/day, in empty stomach in the morning. His social interaction

was significantly increased. The score of social impairment on a visual analogue scale decreased from 10 to 5 in the three-month trial. The aggressive behaviours decreased from 10 to 4. In addition, his drooling, hyperactivity and limited interests were reduced. His preoccupation with the same toy decreased and he started showing interest in playing with different toys. This case suggested that desamoolanavaneetham can decrease the symptoms of autism and can be an effective ayurvedic treatment for autism spectrum disorders. Detailed investigation on the molecular and biochemical mechanisms needs to be understood for a in depth understanding of the mode of action.

### PP 3

#### **Compatibility of entomopathogenic fungi *Paecilomyces lilacinus* with insecticides used in banana cultivation**

**<sup>1</sup>Ann Mary Mathew and <sup>2</sup>Vimi Louis**

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<sup>2</sup>Kerala Agricultural University, Banana Research Station, Kannara, Thrissur-680 652

Integrated pest management is an approach of pest control which utilizes cultural, physical, biological and chemical methods. Biocontrol is an integral component of integrated pest management of banana. Use of biocontrol agents like entomopathogenic fungi along with compatible insecticides enhance the pest control efficiency and thereby reduce the quantity of insecticides required.

The *in vitro* fungitoxic effect of insecticides used in banana cultivation *viz*; acephate (SP 75), chlorpyrifos (EC 20), quinalphos (EC 25), imidacloprid (SL 17.8%), fipronil (SC 5%), cartap hydrochloride (G 4%), flubendiamide (SC 39.35m/m), dimethoate (EC 30%) and chlorantraniliprole (0.4% G) on the vegetative growth of the fungus *Paecilomyces lilacinus* was evaluated by poisoned food technique. Based on the fungi toxicity values, the insecticides were classified into non-compatible / least compatible / moderately compatible and compatible types.

Based on the compatibility to *Paecilomyces lilacinus*, the insecticides quinalphos and chlorpyrifos were classified as non-compatible; fipronil, dimethoate and cartap hydrochloride as least compatible; acephate, chlorantraniliprole and flubendiamide as moderately compatible and imidacloprid as compatible.

The insecticide imidacloprid can be used in banana IPM programs as it is compatible with the entomopathogenic fungus *Paecilomyces lilacinus*, an important biocontrol agent for nematodes and other insect pests of banana.

## PP 4

### **Antimicrobial and cytotoxicity studies of iron oxide nanoparticles synthesized from aqueous leaf extracts of *Hemigraphis colorata* (blume) hallier.**

**Aswany A.C and Neenu A Santhosh**

Department of Botany, St. Mary's college, Thrissur

Iron nanoparticle gaining important for their uses in environmental remediation technologies. Green synthesis of iron nanoparticles has an important role to play in the future medicine. In the present investigation, iron nanoparticles were synthesized and characterized by green route using leaf extracts of *Hemigraphis colorata* (Blume) Hallier F. Iron oxide nanoparticles were generated by reaction of ferric chloride solution with aqueous plant extracts. The reductant present in the plant extracts act as reducing and stabilizing agent. The synthesized nanoparticles were characterized by UV-Visible spectroscopy, FTIR Analysis, XRD, SEM, TEM and SAED Analysis. The antibacterial and antifungal studies were conducted for iron oxide nanoparticles. The antibacterial study against 8 various pathogenic bacteria showed effective against *Pseudomonas aeruginosa* and less effective against *Escherichia coli*. The antifungal studies of FeNPs showed maximum percentage of inhibition against *Sclerotium rolfsii*. The cytotoxicity study of synthesized FeNPs has analysed for short term invitro cytotoxicity activity against Dalton's lymphoma ascites cells bearing mice and showed 44% of cell death in 200 µl concentration. These ecofriendly, cost effective stable nanoparticles synthesized from leaf extracts of *Hemigraphis colorata* can therefore be used as an economic and valuable alternative for the large-scale production of iron nanoparticles.

## PP 5

### **Production of Fertilizer from Waste Paper**

**Athul K Balachandran, Ayishabi, Jewel Mathew, Mary Tania Christopher**

- Sahrdaya College of Engineering and Technology, Kodakara, Thrissur

This project relates to a method for producing a fertilizer and soil conditioner from waste paper, more particularly, it relates to a method for nitration of waste paper to produce a fertilizer and soil conditioner.

Paper is essentially cellulose. When added to soil, they increase the moisture holding capacity of the soil and improve its physical condition. Nitric acid reacts with cellulose to form cellulose nitrate/nitrocellulose, which can improve the water holding capacity of the soil.

Hence, our aim is to produce a fertilizer from waste paper, which would have the benefit of providing an ecologically sound disposal of cellulosic materials and an agricultural benefit of providing a cheap and effective source of fertilizer. Here, shredded waste paper, which is de-inked, is reacted with nitric acid to produce nitrated cellulose in which the inorganic nitrate ion is organically bound to the cellulosic waste paper. The resultant product is neutralized to enhance its stability and is suitable for use as a nitrogen fertilizer and soil conditioner. When phosphoric acid is added prior to neutralization with KOH a complete N-P-K fertilizer results, which is an adequate requirement for plant growth.

## PP 6

### **Muscarinic receptor expression and behavioural changes in monosodium glutamate- treated rats: Neuroprotective role of curcumin**

**Atul P J<sup>1</sup>, Smita M<sup>1</sup>, Anju T R<sup>2</sup>, Joy K P<sup>1</sup>**

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Monosodium glutamate (MSG), a flavor enhancer, elicits excitotoxic effects via glutamatergic receptor system. The biochemical effects of curcumin in ameliorating many diseases are also known. The present study focuses on the effects of MSG administration on muscarinic M1 and M3 receptors, and the ameliorative role of curcumin on behavioral and histological changes in rats. Adult Wistar rats (n=5) were divided into Control, MSG and MSG+Curcumin groups. MSG treatment resulted in a significant increase in food/water intake and body weight. Muscarinic M1 receptor binding was decreased in MSG whereas an improvement was observed in curcumin treated rats. Real time PCR assays of both MSG and treatment showed upregulation of M1 receptors, with the latter showing a decrease in upregulation. M3 receptor gene expression showed down regulation in both MSG and curcumin treated, with a lesser decrease in curcumin-treated group. Histochemical analysis using TOPRO-3iodide staining showed a decrease in cerebellar cell density in MSG group whereas an improvement was observed in curcumin treated group. Behavioural tests like the Open field, grid walk, cage hanging, rotarod and forced swim test indicated deficit in spatial learning, motor coordination and decrease in muscle strength in MSG-treated group whereas the curcumin treatment improved the conditions when compared to the MSG group. The use of MSG as a food additive significantly affects the muscarinic receptor system and hypophagia and weight gain in adult rats. Curcumin is a common food additive that can ameliorate and mitigate the harmful effects of the neurotoxins like MSG, hidden in food.

## PP 7

### **Glutamate and glutamate receptor activity in Epstein-Barr virus infected lymphoma cells**

**Gayathri Krishna, Mohanan Valiya Veettil**

Virology Laboratory, Department of Biotechnology, Cochin University of Science and Technology, Cochin

Epstein Barr virus (EBV), also called the human herpes virus 4 (HHV-4), is a member of the human herpes family. EBV is etiologically associated with the development of nasopharyngeal carcinoma and lymphoid tumors such as Burkitt's lymphoma, Hodgkin's lymphoma and post transplantation lymphomas. The development of EBV-associated cancers depends on the expression of latent viral proteins such as Epstein Barr virus nuclear antigens (EBNAs), latent membrane proteins (LMPs) and Epstein Barr virus encoded small RNA (EBERs) along with the expression of host cellular molecules. Since glutamate is a major component in host cellular metabolism, here we examined the extracellular and intracellular glutamate levels, glutaminase and glutamate receptor expression in EBV infected lymphoma cells. The glutamate levels in the infected cells were determined using a glutamate assay kit, and the glutaminase and glutamate receptor expression were studied using real-time PCR. Analysis of the glutamate levels at different time points showed a slight increase in extracellular glutamate levels, whereas a very high level of intracellular glutamate were observed in the EBV latently infected cells. The expression of glutaminase 2 or GLS2, a mitochondrial enzyme which generates glutamate from glutamine, was also increased in the infected cells. Gene expression profiling of glutamate receptor subtypes in the infected cells demonstrates a low level of mGluR4, NMDA and kainite receptor expression. Intracellular accumulation of glutamate and elevated expression of GLS2 suggest that glutaminolysis and glutamate dependent metabolic pathways may be essential for the rapid proliferation of the EBV-infected lymphoma cells.

## PP 8

### **Market sample survey of *Crocus sativus* linn. to assess the genuinity**

**K R Athira and T V Binu and Dr.Divya.S.Balachandran**

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Herbalism is a traditional medicine or folk medicine practice based on the use of plants and plant extracts. Many of the drugs used in conventional medicine are dried from herbs. Despite the fluctuation in prices in international markets, saffron still remains the most expensive spice. The main aim of this study is to examine the powdery microscopical and phytochemical analysis and adulteration detection of saffron. *Crocus sativus* Linn is a perennial stemless herb of the Iridaceae family. Saffron stigmas of sample1, sample2, sample3 and sample4 are collected from different rates of market sample from Thrissur district, sample 5 collected from the Oushadhi premises, and it is collected from Himachal Pradesh.

In this study detecting the phytochemical and powdery microscopical analysis and adulteration detection of different samples of saffron stigmas. The extracts were prepared by using ethanol as solvent. The saffron stigmas have been studied with regards to its phytochemical and powdery microscopical analyses for the anatomical characters of each sample. The preliminary phytochemical screening was carried out for the presence of alkaloids, flavonoids, carbohydrates, glycosides, phenol, for different market samples of *Crocus sativus* Linn. The standardized genuinity tests were carried to detect the adulteration.

The highest level of secondary metabolites reported in sample 5 collected from Himachal Pradesh. Sample 2 contains lowest levels of phytochemicals. Powdery microscopy enabled to identify the specific anatomical characters of each saffron stigma. The highest level of adulteration detected in sample S3 and sample S2. Synthetic dyes, organic dyes and various types of floral materials are also used in the adulteration. The quality of the samples depends on the price values.

The qualitative specifications and anatomical characters of saffron of different market samples were influenced by different factors such as the quality of saffron stigma, its price, and method of drying. These observations would be of immense value in the botanical identification and standardization of the drug in crude form and would help to distinguish the drug from its other spices.

**PP 9**

### **Studies on the Primary and Secondary Metabolites present in the leaf extracts of *Artocarpus altilis***

**Kavitha.O, Baby Roshma K, Carmel Andria Kadathose, Krishnendhu T S, Mubashira V and Sreelakshmi T B**

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Plant-derived substances have recently become of great interest owing to their versatile applications. Medicinal plants are the richest bio-resource of drugs of traditional systems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs. Some traditional medicines are highly equipped with more qualities in therapeutical basis, majority of the people in developing countries have resorted to the use of medicinal plants as an alternative treatment. Herbal medicines are rich in the active ingredients and are safe with the body chemistry of man. However, plants have forever been a catalyst for our healing. In order to halt the trend of increased emerging and resistant infectious disease, it will require a multipronged approach that includes the development of new drugs. Using plants as the inspiration for new drugs provides an infusion of novel compounds or substances for healing disease. Phytochemical, natural compound occur in plants such as medicinal plants, vegetables and fruits that work with nutrients and fibers to act against diseases or more specifically to protect against diseases. The results obtained in the present study indicates *A.altilis* leaves have the potential to act as a source of useful drugs because of presence of various phytochemical components such as carbohydrate, protein, free aminoacid, steroid, lignin, phenols, flavonoids and tannin. Antimicrobial property is also associated with *A.altilis* leaves. Their methanolic extract show antimicrobial property against *E.coli*, *Klebsiella*, *Staphylococci* and *Bacilli*. The results are very much encouraging and looking forward to more scientific analysis of the various components for their biologic activities.

## PP 10

### **Prokaryotic expression and *in silico* structural confirmation of guinea pig IL-4**

**Madhavan Omankuttan<sup>1</sup>, Hanumohan R. Konatham<sup>1</sup>, Jeevan Amminikutty<sup>2</sup>, Prakash N. Reddy<sup>1</sup>, Malathi Jojula<sup>3</sup>, David McMurray<sup>2</sup> & Dirisala VR<sup>1\*</sup>**

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Interleukin-4 is a signature cytokine produced by T-helper type 2 (Th2) cells which plays a major role in shaping immune responses. The role of IL-4 protein has not been studied in the guinea pig, a highly relevant animal model for this disease. In the present study, guinea pig IL-4 gene was expressed using prokaryotic expression vector and the expressed protein was purified and confirmed by mass spectrometry analysis. Polyclonal anti-IL4 antibodies were generated in rabbit using the recombinant protein generated in this study. Western blot analysis revealed that the polyclonal antibodies generated using the recombinant IL-4 protein reacted strongly and specifically with the generated antibody. The results obtained from homology modeling showed that the structure of guinea pig IL-4 resembles that of human IL-

4. Taken together our study indicates that the guinea pig IL-4 gene expressed in this study and its in silico structural analysis will serve as valuable resource for immunological studies in the guinea pig model of infectious and non-infectious diseases.

#### PP 11

### **Point mutations putatively associated with acephate resistance in the brown planthopper, *Nilaparvata lugens* (Stål)**

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The brown planthopper (BPH), *Nilaparvata lugens* (Stål) (Homoptera: Delphacidae) is one of the serious pests of rice throughout Asia. Control of BPH relies primarily on the application of chemical insecticides; however, the extensive use of insecticides has resulted in development of insecticide resistance leading to frequent control failures in the field. Knowledge of the mechanism underlying resistance enables formulation of efficient pest control strategies. Present study was aimed to examine the involvement of target-site mediated mechanism of resistance, to acephate, an organophosphate, in the field-collected populations of *N. lugens*. Four point mutations, putatively associated with organophosphate and carbamate resistance in acetylcholinesterase (AChE1) gene was surveyed in the Warangal and Gangavati populations of *N. lugens* which showed 20.8 and 15.3 -fold resistance to acephate respectively, as compared to an insecticide-susceptible population. A 253 bp fragment encompassing G119A mutation and 280 bp fragment encompassing F/Y330S, F331H and I332L mutations were amplified using the cDNA as template. The partial sequences obtained, were subjected to BLAST analysis. The sequences were aligned using Clustal Omega for screening of the point mutation sites. Comparison of the AChE1 sequences of susceptible, Gangavati and Warangal populations showed that the G119A mutation and F/Y330S mutation were not present in any of the populations; however, the F331H and I332L mutations were found in the Warangal population. The gene level modifications imply the partial role of altered acetylcholinesterase as a mechanism of acephate resistance in the Warangal population. The results are beneficial in choosing appropriate insecticides for *N. lugens* control

#### PP 12

### **Stimulatory effect of jasmonic acid on withaferin A production in hairy root cultures of *Withania somnifera* Poshita variety**

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Hairy root cultures have been viewed as promising alternatives to whole plant extraction for obtaining potential secondary metabolites. The biosynthetic capacity of the hairy root cultures is equivalent or sometimes more to the corresponding plant roots with regard to production of steroidal lactones. Henceforth, this study was initiated to analyze the eliciting effect of jasmonic acid on the production of Withaferin A in *Withania somnifera* Poshita hairy roots. Leaf explants were infected with *Agrobacterium rhizogenes* strain A4, which led to the induction of hairy roots. Transgenic nature of the hairy roots was confirmed by PCR using rolA specific primers and subsequently hairy roots were transferred to suspension cultures. Two week cultured cell suspensions grown in MS medium were supplemented with Jasmonic acid at the concentrations of 1.0–5.0 mg l<sup>-1</sup>. After 28 days of exposure elicited roots were extracted and HPLC analyzed to establish the chemical profile of constituents. The type of elicitor and its concentration were found to strongly affect the content of each analyzed compound. Treatment with 2.0 mg l<sup>-1</sup> was the most effective in increase of withaferin A content (832.1 µg g<sup>-1</sup> d. wt.). Cultures supplemented with Jasmonic acid enhanced the steroidal compounds significantly compared to that of non-elicited hairy root cultures. Compared to control, the production of withaferin A in elicited plants was 3 fold higher. Stable and high-level production of secondary metabolites is reflected in both the tested elicitors. Thus, elicitation strategy proves to be advantageous in synthesizing withaferin A from hairy root cultures as continuous source of plant secondary metabolite production.

### PP 13

#### **Cellulose degradation and antioxidant activity of *Acinetobacter baumannii* A85 isolated from the micro-niche of *Oryza sativa*. L**

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Rice (*Oryza sativa*, L) is economically important cereal which plays an important role in Indian economy. The present study is based on the isolation and characterization of bacterial strain from the micro niche of rice grains by 16srRNA gene sequencing, using colony PCR. The bacteria were isolated from the micro niche of rice grains by serial dilution method (10<sup>-3</sup>, 10<sup>-5</sup>, and 10<sup>-7</sup>) and the cultures were maintained by suspending pure single colonies in nutrient agar broth. Morphological characterization of isolated strain was done by Gram staining and found that were pink coloured, aerobic and gram negative cocco-bacilli. The preliminary identification and characterization of isolated bacteria under study were done by using VITEK 2 machine, which read the isolated bacteria as *Acinetobacter baumannii*. Using colony PCR amplification of 16S rRNA gene sequence of *Acinetobacter baumannii* was done in order to confirm the bacterial strain with the help of BLAST search tool. Cellulose degradation assay of the enzyme cellulase present in the bacterial strain was evaluated. Congo red assay was a preliminary qualitative test to determine the cellulose degradation by

the enzyme cellulase. Zone of clearance was observed visually by staining plates with 0.1% Congo red and destained with 1M NaCl. The production of cellulase enzyme and degradation of cellulose was estimated quantitatively by DNS method at different incubation period. It was observed that the rate of degradation was high at 72 hour incubation. The isolated bacterial strain is also checked for antioxidant property. It was observed that cell free extract of *Acinetobacter baumannii* A85 have highest inhibitory action at 72 hour culture.

#### PP 14

### **Characterization of *Woodfordia fruticosa* from asavaristam slurry and sustainable utilization, management of traditional knowledge**

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*Woodfordia fruticosa* commonly called Tatirippuvu or Fire flame bush is a seasonal flower seen throughout India. It is a commonly used fermentation enhancer in Ayurvedic preparations, especially in Asavarista formulation. Maintenance of this flowers without contamination for long time, requirement of bulk quantity etc are its drawbacks in industry.

In this study the residue ( Ayurvedic fermentation waste/slurry ) left over after distillation was re-used as fermentation enhancer and the parameters was found similar to the normal acceptance criteria. More over the coconut water wasted in kopra industry was used as an effective medium for the growth of yeast biomass isolated from Asavaristam slurry. About 25% of yeast biomass was obtained and used for Asavarista formulation. It can act as a substitute for Tatirippuvu.

Thus by combining principles of Ayurveda and Biotechnology various cost effective, Eco-friendly methods with economic importance were identified.

#### PP 15

### **Evaluation of effect of hydroethanaolic fraction of unripe fruit of *Carica papaya* Linn on haematological parameters in pregnant wistar albino rats**

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The aim of the present study was to screen the effect of administration of hydroethanaolic fraction of unripe fruit of *Carica papaya* Linn on haematological parameters in pregnant rats. The unripe fruit of *Carica papaya* L was procured. The extraction was performed and the

phytochemical analysis was conducted. Pregnant rats were taken and divided into various groups for the experiments. Oral administration of the extract was given to all groups except the control group. At the end of the experiment all the rats in each group were sacrificed. Analysis of various hematological parameters viz changes in the RBC, WBC, haemoglobin content and hematocrit values were performed. The observations from the present study suggested that the extract did not alter the factors significantly even during pregnancy and hence was safe for consumption.

## PP 16

### **Molecular phylogenetic analysis of *Nezara viridula* using mitochondrial COI gene**

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DNA barcoding has become the method of choice for a rapid, reliable, and cost-effective identification of pest species. Since DNA barcoding have proven to be highly efficient in identifying both immatures and adults, it is used to differentiate invasive and native pests. It has been used in managing species complexes in agricultural, IPM systems and also in the cases unpredictable species. Recently, DNA barcoding of partial mitochondrial COI gene is found to be very popular in identifying various agricultural pest species. The present study investigates the molecular evolution of the *Nezara viridula* species using COI gene and its usefulness for reconstructing phylogenetic relationships within and among different species.

## PP 17

### **Strain improvement of *Streptomyces gedanensis* for leucine amino peptidase production by classical mutagenesis**

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The present study was looked at the strain improvement for enhanced production of leucine amino peptidase (LAP) in submerged fermentation. Improvement of microbial strains for the over-production of industrial products has been the hallmark of all commercial fermentation processes. Strain improvement was done by mutating the microorganism, *Streptomyces gedanensis* with UV irradiation and chemical mutagens. The results showed that UV mutation was not suitable for enhanced LAP production. But the chemical mutagens, N-methyl-N'-nitro-N-nitrosoguanidine (NTG), NTG-1, NTG-2, NTG-3 and 4- nitro-quinoline-1-oxide, NQ-6 and NQ-10, were effective to produce mutants with higher LAP production

than the wild type parent strain. The stable mutants were selected based on the consistent expression of the enzyme production up to five generations.

#### **PP 18**

### **Isolation, characterization and applications of fish skin collagen in food industries**

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Collagen has enormous applications in food, biomedical and pharmaceutical industries; but its high cost has severely limited its usage. Underutilized fishes are a promising source of collagen, which otherwise stated as an earnest environmental pollutant. Acid-soluble collagen (ASC) was isolated from skin of Sucker catfish (*Pterygoplichthys pardalis*). The yield of ASC was 13.79% (on the wet weight basis) and the same was characterized and confirmed as type I collagen by SDS–PAGE and FTIR spectroscopy. Considering the bioactive properties of collagen, a milk based food product - paneer was developed by incorporation of the extracted collagen. Composed paneer was found to be acceptable with good sensorial and textural attributes.

#### **PP 19**

### **Mitochondrial DNA based analysis of *Evania appendigaster* Linnaeus, an egg parasitoid of cockroach**

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The superfamily Evanioidea of order Hymenopteran is a small one and only few described species. *Evania appendigaster* is a egg parasitoid of cockroach . PCR amplification of partial COI sequence of *E. appendigaster* (GenBank Accession No. KU 510324) isolated from Kerala, India yielded a product with 573bp. The nucleotide divergence analysis revealed that, the *E. appendigaster* cytochrome oxidase I gene (COI) sequence showed 17.0% divergence from the COI sequence of Tiphiiidae species. The phylogeny analysis using NJ tree revealed the sharing of common ancestor of these two species. The COI DNA barcode developed in this study can be used for the taxonomy and phylogeny analysis of the *E. appendigaster*.

#### **PP 20**

### **Membrane development from banana peels for industrial effluent treatment**

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Nowadays various toxins are being released into water bodies which lead to severe pollution and disturb the natural existence of the environment. The most common heavy metals are found to be lead and copper, which are fatal to the health and environment. The potential of banana peels are studied for developing a membrane, because the available treatment methods are expensive. These peels are cheap, easily available and can perform adsorption without any chemical modification.

The present investigation focuses on developing a membrane from banana peels for the industrial waste water treatment. The objective of this project is to use local raw materials to produce eco-friendly low-cost membranes. For this purpose, Phase Inversion Technique is chosen. The peel fibers are to be extracted by Kraft Process and to be used as raw material for the membrane preparation. The study presented herein is aimed to remove metal ions as well as dyes by bio sorption technique. The purpose of this work was to study the feasibility and comparative analysis on cost effectiveness of banana as well as orange peel membrane in bio sorption. The membrane developed out of these peels will be economical to the industrialists. Hence the present study showcases on utilization of a low cost raw material along with its adsorptive ability, in managing metal removal as well as dyes from industrial waste water.

#### **PP 21**

### **Hypoglycemia Induced Decreased GABA receptor expression in the Corpus Striatum of Streptozotocin Induced Diabetic Rats**

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The CNS neurotransmitters play an important role in the regulation of glucose homeostasis. Hypoglycemic brain injury is a common and serious complication of insulin therapy associated with diabetes, which is the major barrier in blood glucose homeostasis during diabetes therapy. The Corpus striatum expresses high sensitivity to aglycemic insults. Present study evaluated the effect of insulin induced hypoglycemia and STZ induced diabetes on striatal GABA receptor expression in experimental rats. Real Time PCR analysis of GABA<sub>Aα1</sub> receptor mRNA showed significant down regulation ( $p < 0.001$ ) in the corpus striatum of diabetic and hypoglycemic rats compared to control rats. Gene expression of GABA<sub>B</sub> receptor mRNA also showed significant down regulation ( $p < 0.001$ ) in the corpus striatum of diabetic diabetic and hypoglycemic rats. Our results shows that during hypoglycemic insults, striatal GABAergic synaptic transmission is altered which leads to neuronal vulnerability in striatum during recurrent hypoglycemia during Diabetes therapy.

#### **PP 22**

### **Investigation of alpha amylase inhibitor activity of coconut shell**

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Diabetes is a chronic disease associated with abnormally high levels of glucose in blood. Due to the presence of certain secondary metabolites many Indian medicinal plants are being using as a novel anti diabetic agent. Inhibition of alpha amylase enzyme is an effective strategy to control blood glucose level. The present study aims to investigate the alpha amylase inhibitor activity of coconut shell extract and it is collected from Pulpally, Wayanad. From the study it was found that the coconut shell extract have significant alpha amylase inhibitor activity and can be used as a medicine for diabetes mellitus.

**PP 23**

### **Drug Repositioning in omics era- Identifying new uses of old drugs**

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Drug discovery is an extensive process involving target identification, small molecule screening, optimization, preclinical and clinical trials and finally to market. The number of new drugs released in the market is decreasing and there is an acute pressure on the pharmaceutical industry to increase the number of candidate drugs in the late stage pipeline. Many times the toxicity is shown long after the approval of the drug that leads to its withdrawal from market e.g. cerivastatin. Therefore, a new concept called “drug repositioning” is being emerged. Drug repositioning is the process of finding new uses outside the scope of the original medical indication. We utilized a targeted approach for identifying new uses, where anti glycating effect of old drugs are examined. Glycation is a series of chemical reactions between proteins and reducing sugars leading to formation of heterogeneous Advanced Glycation End products (AGEs). AGEs are associated with diseases such as diabetic complications, atherosclerosis, Cancer and aging. The non-enzymatic reaction between glucose and protein can be chemically reversed by transglycation. Here we report the transglycation activity of hydralazine using a newly developed MALDI-TOF-MS based assay. Hydralazine mediated transglycation of HbA1c, plasma proteins and kidney proteins was demonstrated in streptozotocin (STZ) induced diabetic mice, as evidenced by decrease in protein glycation, as well as presence of hydralazine-glucose conjugate in urine of diabetic mice treated with hydralazine. Hydralazine down regulated the expression of Receptor for Advanced Glycation End products (RAGE), NADPH oxidase (NOX), and super oxide dismutase (SOD). These findings will provide a new dimension for developing intervention strategies for the treatment of glycation associated diseases such as diabetes complications, atherosclerosis, and aging.

**PP 24**

### **In vitro studies on stimulation of withanolide A production using fungal elicitor in hairy root cultures of *Withania coagulans***

**Viji M O and Neeba Wilson**

Secondary metabolite synthesis and accumulation in cell cultures can be triggered by the application of elicitors to the culture medium. In the present work, elicitation of withanolide A was experimentally worked out using fungal elicitor *Aspergillus niger*. Dried autoclaved fungal mats of *Aspergillus niger* were constituted for elicitor assimilation. Induction and establishment of *Agrobacterium* mediated hairy root culture was developed on hormone free liquid MS Medium. Emergence of hairy roots from the leaf explants was noted after 14th day of infection. The transformation of hairy roots was established by PCR. After 3 weeks of root initiation the roots were separated from the explants aseptically and were sub cultured into 100ml aliquots of MS medium. The cultures were maintained on orbital shaker under continuous agitation at 120 rpm at 25±2°C. Fungal extracts of *Aspergillus niger* was added to a liquid MS medium separately at 1mg l<sup>-1</sup>. After 30 days of root cultures in suspension, the fresh weight of the root was noted and finally the growth index was calculated. Quantitative measurement of Withanolide A content was done by HPLC. *Aspergillus niger* cell lysate was positively effective in *Withania coagulans* with regard to the production of withaferin A. Contents of withaferin A increased more than 2 folds and were found to be significant (1832.07µg g<sup>-1</sup> d. wt) in the treated roots as compared with the non-treated roots. The adopted strategy has opened a new avenue for the production of steroidal lactones from *Withania coagulans*.

**PP 25**

### **Free radical scavenging activity of Custard apple and Tamarillo**

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Free radicals, with their unpaired electrons, are highly reactive and can cause damage to our cells. Production of free radicals in our body can be attributed to endogenous processes like metabolism or external sources like air pollution, smoking and industrial chemicals. An imbalance in free radical generation and our body's antioxidant system leads to oxidative stress. Fruits and vegetables are a rich source of antioxidants. In this study, two fruits, Custard apple and Tamarillo, were analysed for their total polyphenol content, reducing power and free radical scavenging activity. Quantification of polyphenols in the methanol extracts of these fruits was done by Folin-ciocalteau method. Reducing power was estimated using potassium ferricyanide and ferric chloride. Free radical scavenging activity of various concentrations of the extract was analysed using DPPH assay. The total polyphenol content of custard apple and tamarillo were found to be 88 and 97 mg Gallic acid equivalent per g of crude extract. The reducing power of these fruits was almost similar. Custard apple was found to have a higher free radical scavenging activity compared to Tamarillo. The study showed that both the fruits are rich in antioxidants.

