New Horizons in Translational Medicine 3 (2016) 30–61

Contents lists available at ScienceDirect

New Horizons in Translational Medicine

journal homepage: www.elsevier.com/locate/nhtm

Scientific Abstracts presented at the 5th International Convention of Association of Pharmacy Professionals: Redesigning Pharmacy Education and Regulations for Translational Drug Research in India, hosted at Anna University, Centre for Excellence in Nanobio Translational Research, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India, 22nd–23rd January, 2016.

Edited by Selvamani Palanisamy [a], Latha Subbiah [b], Ruckmani Kandasamy [c]

[a] Assistant Professor, Centre for Excellence in Nanobio Translational Research & Department of Pharmaceutical Technology Anna University Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
[b] Assistant Professor, Centre for Excellence in Nanobio Translational Research & Department of Pharmaceutical Technology Anna University Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
[c] Professor and Director, Centre for Excellence in Nanobio Translational Research & Department of Pharmaceutical Technology Anna University Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India

Oral Presentations

PCO-01

Chemotherapeutic Effect of 3,3′-Diindolylmethane (DIM) Encapsulated Chitosan Nanoparticles (DIM@CS-NP) on DMBA Induced Mammary Cancer – A Dose Dependent Study

Isabella Stainsloss, Mirunalini Sankaran*
Department of Biochemistry and Biotechnology, Annamalai University, Chidambaram, Tamil Nadu, India
mirunasankar@gmail.com

Introduction: Globally, breast cancer is the second most prevalent cancer among women and its incidence is amplifying alarmingly. Since genetic factors is believed to account for only 10% of the reported cases, remaining the environmental factors including diet are thought to play a significant role in predisposing breast cancer. Many bioactive compounds have been reported for their anticancer potential. One among the bioactive compound is 3,3′-diindolylmethane (DIM) is a phytochemical possess a wide array of pharmacological activities such as anti-proliferative and anti-oxidant properties. Its properties such as poor water solubility and low bioavailability have hampered its clinical development. Therefore, it is a great interest to study whether the nano formulation for DIM with chitosan for an enhanced their potential, the present study was aimed to evaluate the chemotherapeutic potential of 3,3′-diindolylmethane (DIM) encapsulated chitosan nanoparticles (DIM@CS-NP) on 7,12-dimetheyl benz(a)anthracene (DMBA) induced mammary carcinoma in female Sprague Dawley rats.

Methods: DMBA was induced in a single subcutaneous injection of 25 mg/kg body weight to each rat. In the present study, we investigated altered the activities of lipid peroxidation, enzymatic antioxidants (SOD, CAT, GPx) and non- enzymatic antioxidant (GSH) in plasma, liver and mammary tissue, supported by histopathological study of mammary tissues.

Results: We evaluated the changes in the body weight of control and experimental animals. There was an significant decreased in the final body weight of tumor bearing animals, when compared to control animals. However, administration of DIM@CS-NP significantly increased the mean final body weight when compared with DMBA induced animals. Further, there was an diminished cellular antioxidant status and the elevated oxidant levels in plasma, liver, mammary tissues of DMBA induced rats. Whereas, after oral supplementation with different dose of DIM@CS-NP, DIM@CS-NP 0.5 mg/kg BW significantly renovated the activities of cellular antioxidants and ultimately diminished the level of lipid peroxidation which point towards suppression of preneoplastic lesions thereby reduced the cancerous risk, and significant improvement in the levels of enzymatic (SOD, CAT, GPx) and non- enzymatic antioxidant (GSH) in the plasma, liver and mammary tissue.

Conclusions: Based on the above finding we conclude the nano formulation of DIM provides a novel therapeutic regime for mammary cancer.

PCO-02

Pharmaceutical Effect of Harmalol, A Natural Product, in $HepG_2$: *In-vitro* Cytotoxicity and Binding Studies

Kakali Bhadra*

http://dx.doi.org/10.1016/j.nhtm.2016.01.001

University of Kalyani, Department of Zoology, Kalyani, Nadia 741235, West Bengal, India
kakali_bhadra2004@yahoo.com

Introduction: Plant alkaloids as chemotherapeutic agents isolated so far, have been reported to have remarkable anti-cancer applications that may be exploited effectively for the betterment of mankind. Chemoprevention is one of the most promising and realistic approaches in prevention of cancer and consequently there is growing interest in the search for anti-cancer drugs with high efficacy, low toxicity and minimum side effects. But most of the chemotherapeutic agents due to their rather non-selective nature and dose limiting toxicity, use is often restricted, necessitating search for newer drugs having greater potential and suitability for use.

Methods: In-vitro cytotoxicity and binding study was performed using various biochemical assays and biophysical techniques.

Results: The study tested chemotherapeutic potential of harmalol in HepG2 cells in-vitro with special emphasis on its apoptotic induction ability and alkaloid-nucleic acid interaction. Apoptotic hallmarks like internucleosomal DNA fragmentation, membrane blebbing, cell shrinkage, chromatin condensation, change of mitochondrial membrane potential and comet tail formation was analyzed in the harmalol treated HepG2 cells. Further LDH assay emphasized on apoptotic index parameters in the control and treated cell line. The alkaloid shows ROS dependent cytotoxicity with accumulation of cells in the Go/G1 phase of cell cycle. Data from competition dialysis experiment, circular dichroism and fluorescence spectroscopic analysis of the binding of harmalol with ds CT DNA, ss polyA and ds poly(rG.rC). poly(rG.rC) shows interaction with both DNA and RNA, more preferably with ds DNA and ds RNA.

Conclusions: The results contribute anticancer potential of harmalol through its ability to induce apoptosis and interaction with nucleic acids that changed the structural conformation of the macromolecules, proving the alkaloid to be a promising small molecule for chemoprevention.

PCO-03

Anti-hyperlipidemic and Anti-atherosclerotic Effects of Rutin and Curcumin in Diet-Induced Hypercholesterolemic C57BL/6J Diabetic Mice

Karthik Mohan*[1], Velmurugan Ramasamy[2], Shabana Begum Mustapa[2], Rajeshwari Bharathy[3]
[1]Department of Biochemistry, St. Joseph's College (Autonomous), Tiruchirappalli 620002, Tamil Nadu, India
[2]Department of Biochemistry, Muthayammal College of Arts and Science, Rasipuram, Namakkal, Tamil Nadu, India
[3]Department of Chemistry, University College of Engineering, Thirukkuvalai – Anna University Constituent College, Nagapattinam, Tamil Nadu, India
km80_profsjc@yahoo.co.in

Introduction: The prevalence of diabetes is rapidly rising all over the globe at an alarming rate and India is justly called as the "diabetes capital of the world", since every Indian household has got at least one diabetic patient. Diabetes, besides having its own complications is now an important risk factor for the pathogenesis of atherosclerosis. Hyperglycemia induces a large number of alterations at the cellular level of vascular tissue that potentially accelerate the atherosclerotic process. Though there were several treatment modalities available to treat diabetes accelerated atherosclerosis symptomatically, the search for a drug which is natural, non-toxic, with no side effects and could be taken as food is still very viable. Hence the prime objective of this work is to determine and compare the efficacy of two dietary polyphenols rutin and curcumin in diet induced atherosclerosis like condition in diabetic C57BL/6J mice.

Methods: The anti-atherosclerotic effect of flavonoids rutin and curcumin was tested in diabetes and atherosclerotic susceptible male C57BL/6J strain of mice. Diabetes was induced by streptozotocin (40 mg/kg of body weight, i.p, single dose) and animals exhibiting FBG above 250 mg/dl were divided into three groups with 6 animals per group. All the three group animals were fed with high cholesterol diet for 6 weeks. One served as the experimental control group, the other group animals received rutin (50 mg/kg of body weight/day for 6 weeks) mixed with diet and the third group with curcumin (50 mg/kg of body weight/day for 6 weeks) in diet. A control group of animals were also maintained under same experimental conditions.

Results: At the end of the experimental period animals were sacrificed, samples collected and analyzed. Blood glucose, lipid profile (total cholesterol, TG, HDL, LDL, VLDL, PL) parameters of endothelial dysfunction (sVCAM-1, Fibrinogen, NO levels and oxidized LDL) and atherosclerotic parameters (aortic wall changes, aortic lipid levels) were studied. The results indicated that both the dietary polyphenols exhibited significant curative effect in experimentally induced diabetes accelerated atherosclerosis.

Conclusions: Among the two flavonoids curcumin pronounced slightly better effects than rutin. Both these flavonoids exhibited beneficial effects in hyperglycemic, hyperlipidemic and atherogenic index in diabetic mice.

PCO-04

Anti Ulcerogenic Effects of Some Spices using HCl–Ethanol induced Gastric Ulcer Model

Monallisha Mallick*, Sangeeta Mukhi, Anindya Bose
Department of Pharmaceutical Analysis & Quality Assurance, School of Pharmaceutical Sciences, Siksha 'O' Anusandhan University, Bhubaneswar 751003, Odisha, India
monallishamallick202@yahoo.com

Introduction: The peptic ulcer is one of the most common disorders of the gastrointestinal system. Various drawbacks of allopathic antiulcer drugs like habituation, safety issues, high cost, etc. have created interested in a scientific exploration of antiulcer natural remedies. Natural spices namely fennel fruits (*Foeneculum vulgare*), fenugreek seeds (*Trigonella foenum Graecum*), coriander seeds (*Coriandrum sativum Linn.*) and black pepper fruits (*Piper nigrum*) may have potential anti-ulcer activity.

Methods: The present work has been aimed to evaluate the anti-ulcerogenic activities of the spices (300 mg/kg, p.o.) in HCl–ethanol-induced model in comparison with standard antiulcer drug ranitidine (10 mg/kg, p.o.). The parameters taken to assess anti-ulcer activity were the volume of gastric secretion, pH, free acidity, total acidity and ulcer index.

Results: The results indicated that the spices produced a reduction in the gastric volume, free acidity, total acidity, ulcer index and raised gastric pH significantly in comparison with control groups. The reference drug ranitidine also produced similar effects and the percent protection in ulcer index offered by seeds of *Coriandrum sativum Linn.,* fruits of *Foeneculum vulgare*, fruits of *Piper nigrum*, seeds of *Trigonella foenum Graecum* and ranitidine were found to be appreciable. Moreover, it was evident that in the animals administered with the spices or ranitidine, there were a reduction in visible ulcers and haemorrhagic streaks in ulcers, comparison to controlled animals.

Conclusions: Hence, it can be concluded that these spices can be used commercially as sources for treatment of peptic ulcers.

PC0-05

Antimicrobial Property from Desert Actinobacteria *Streptomyces griseorubens* Strain DA3-7

Krishnasamy Nithya[1], Chinnasamy Muthukumar[1], Dharumadurai Dhanasekaran*[1]

[1]Laboratory of Bioprocess Technology, Department of Microbiology, School of Life Sciences, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India.

dhansdd@gmail.com

Introduction: Actinobacteria is well known for their economic importance as they produce biologically active substances such as antibiotics, vitamins and enzymes. It has been estimated that approximately one-third of the thousands of naturally occurring antibiotics has been obtained from actinobacteria. The antibiotic resistance and decrease in the rate of discovery of new antimicrobial compounds draw the attention of scientists to try to investigate unexplored habitats for novel actinobacteria as possible candidates of new antimicrobials. Therefore, we are interested to screen the Saudi Arabian desert actinobacteria as a new source for the production of novel active compounds.

Methods: The present investigation highlighted the isolation of actinobacteria from the Saudi Arabian desert soil samples and screened their antimicrobial potential. Totally 134 morphologically distinguished culturable actinobacterial isolates were isolated from 10 different desert soil samples. Based on preliminary screening, only 16 isolates were exhibited the antimicrobial potential.

Results: Among them, the isolate DA3-7 showed broad spectrum antimicrobial activity including both Gram-positive and Gram-negative and also fungi. The isolate DA3-7 was characterized based on morphological, physiological, biochemical and molecular characterization including 16S rRNA gene sequence analysis

Conclusions: Bioactive compounds were extracted from the isolate DA3-7 using ethyl acetate, and minimum inhibitory concentration was determined, and also the active compound was identified based on GC–MS analysis.

PCO-06

Anti-Diabetic and Insulin Secretory Effect of Terpenoid Fraction Isolated from *Naravelia zeylanica* on MIN6 Cells

Rajakalanithi Ayyanan, Sujatha Sundaresan*

Department of Biotechnology, School of Bioengineering, SRM University, Kattankulathur, Tamil Nadu, India

sujatha.sa@ktr.srmuniv.ac.in

Introduction: Medicinal plants serve as the principle source of raw materials for various ailments since centuries. Several plants were scientifically proved for various pharmacological activities. It have been used traditionally in Indian system of Ayurveda, which provides a valuable source of oral hypoglycemic compounds for the development of new therapeutic strategies. *Naravelia zeylanica* is an indigenous medicinal plant that has been reported to have wide biological activities. In the present study, the effects of terpenoids (TEP-F) isolated from *Naravelia zeylanica* were evaluated on insulin secretion together with an exploration of their mechanism of action in Min6 cells.

Methods: In the present study, Min6 cells were treated with varying concentration of TEP-F (1 ng to 10 μg) for 24 h to check the bioactivity for glucose-stimulated insulin secretion (GSIS) and glucose uptake potentials with basal (4.5 mM) and stimulated the (16.5 mM) level of glucose concentration. The intracellular calcium levels were analyzed using FURA-2AM as the fluorescent probe. The influence of TEP-F on protein expression has been evaluated to unravel the mechanistic action in insulin secretion.

Results: The isolated TEP-F promoted glucose uptake in a dose-dependent manner with increased insulin secretion at the stimulated level of glucose (16.5 mM). The optimum concentration of the fraction was at 1 μg/ml. TEP-F displayed significant potential concerning increasing intracellular calcium and cAMP levels even in the presence of a phosphodiesterase inhibitor, IBMX in MIN6. Immunofluorescence and immunoblot analysis indicates increased GLUT2 protein expression with increasing time.

Conclusions: Current observations conclude that TEP-F shows the uptake of glucose causing a concomitant increase in intracellular calcium and cAMP levels and increased GLUT2 protein expression in β-cells. Overall, the TEP-F mixture has proved to have significant insulin secretogogue, insulinomimetic and cytoprotective effects and can be evaluated for clinical trials as a therapeutant in the management of diabetic manifestations.

PCO-07

Evaluation of Anti-Ulcerogenic Activity of Samasharkara Churna by HCl/Ethanol-Induced Ulcer Model

Sangeeta Mukhi*, Monallisha Mallick, Anindya Bose

Department of Pharmaceutical Analysis and Quality Assurance, School of Pharmaceutical Sciences, Siksha O Anusandhan University, Bhubaneswar, Odisha, India

sangeeta.mukhi22@gmail.com

Introduction: Samasharkara churna, a poly-herbal formulation, is one of the popular Ayurvedic formulation is prescribed for many diseases including pita doshas (gastritis), but the scientific documentation with regards to its effect on the indication is lacking. In our present work, Samasharkara churna was evaluated for gastro protection in rats using the HCl/ethanol-induced ulcer model.

Methods: As per the protocol of this model, the rats were divided into four groups comprising of 6 rats each and treated respectively with water (normal control group), HCl–ethanol mixture (disease control), Samasharkara churna at dose of 100 mg/kg body weight (treated group) and ranitidine at dose of 10 mg/kg body weight (reference group). Thirty minutes after the treatment, 1 ml of acidified ethanol solution was orally administered to each rat. One hour later the rats were euthanised with an excess of anesthetic ether and stomach was cut open along the greater curvature, cleared of residual matter with saline and the inner surface was examined for ulceration. Efficacy was assessed by determination of gastric secretion, pH, free acidity, total acidity and ulcer index. The ulcer index in the formulation-treated animals was found to be significantly less compared to vehicle control animals.

Results: This observed antiulcer property was found more prominent in animals in which ulcers were induced by HCl/ethanol. Reference drug ranitidine (10 mg/kg) also produced a significant gastric and duodenal ulcer protection when compared with the control group. The anti-ulcer activity of the formulation was, however, less than that of ranitidine. To investigate the cause of the observed antiulcer activity Samasharkara churna, *in-vitro* antioxidant assay was also evaluated by various models like total flavonoid content, total phenolic content and DPPH scavenging. DPPH (2,2-diphenyl-1-picrylhydrazyl) scavenging activity study was performed using ascorbic acid as a standard antioxidant. Similarly, total flavonoid content and total phenolics content were calculated using the standard curve of quercetin and gallic acid respectively. Results of the present work suggested that the Samasharkara churna possesses significant antiulcer property that could be either due to the cytoprotective action of the drug or by strengthening of gastric, duodenal mucosa and thus enhancing mucosal defence.

Conclusions: The profound antioxidant activity of the churna observed in different tested antioxidant models gastro protective activity could be responsible for protecting gastric mucous cells from damage caused by oxidative stress and contributed in the mechanism of protection against gastric ulcer of the churna formulation.

PCO-08

In-vitro Cytotoxicity & Anti-Inflammatory Studies of Silver nanoparticles Synthesized from _Ganoderma lucidum_

Sneha Paul[1], Changam Sheela Sasikumar*[1], Balakumuran Manickam Dakshinamoorthi[2], Puthupalayam Thangavelu Kalaichelvan[2]

[1]Department of Cellular & Molecular Biochemistry, Frontier Mediville (Affiliated to University of Madras), Chennai, Tamil Nadu, India

[2]CAS in Botany, University of Madras, Guindy Campus, Chennai, Tamil Nadu, India

sheelsasic@yahoo.co.in

Introduction: In the most recent decade, much focus has been given to study the impact of silver nanoparticles (AgNPs) against cytotoxic and anti-inflammatory effects. Apart from elucidation about the mechanism of silver nanoparticles association with mammalian cells, these studies are intended to focus on the cytotoxicity impact and anti-inflammatory action of silver nanoparticles synthesized by *Ganoderma lucidum*.

Methods: The prepared bio-silver nanoparticles have been subjected for kinetic investigations of the nanoparticles and further described by different analytical techniques, for example; ultraviolet–visible spectroscopy, High resolution-transmission electron microscope, X-ray diffraction spectroscopy, inductively coupled plasma atomic emission spectroscopy and Energy dispersion spectroscopy. *In-vitro* anti-inflammatory activity was analysed using membrane stabilization assay, Protein denaturation assay and anti-proteinase assay, HET-CAM assay were used to assess the anti-inflammatory and anti-property of synthesized silver nanoparticles. *In-vitro* cytotoxicity studies were analysed using MTT assay against *Vero* cell line and *HeLa5* cancer cell line and further apoptosis analysed by AO-EB staining.

Results: The analytical method reveals about silver nanoparticles size and morphology details. UV–visible spectrum shows the SPR band at 420 nm which confirms the formation of silver nanoparticles. The average particle size of synthesized-silver nanoparticles was found at the range of 20-50 nm and morphology of nanoparticles are spherical in shape determined by HR-TEM. The amount of silver present in the solution was found to be 144 mg/L using ICP-AES and EDAX confirms the presence of silver in the solution. Bio-silver nanoparticles were further evaluated for their anti-inflammatory activity such as membrane stabilization assay (15.1 ± 0.50 mg/ml), protein denaturation assay (13.1 ± 0.30 mg/ml)and anti-proteinase (9.0 ± 0.30 mg/ml) assay; IC_{50} value of synthesized silver nanoparticles from all this analysis were taken further for HET-CAM assay to investigate the anti-inflammatory and irritant properties. A scoring notification of haemorrhaging, membrane lysis/irritation and coagulation was noted, at the concentration of synthesized silver nanoparticles had good effect (no irritation to membrane). This indicates the presence of bioactive compounds responsible for reduction of silver nanoparticles having therapeutic potential in alleviating the inflammatory condition. *In-vitro* cytotoxicity studies were explicated out *in vero* cell line and HeLa cell line. From the result , it consequently demonstrating less toxicity towards the normal cell line than cancerous cell line.

Conclusions: The outcomes of our research work demonstrated that the biological synthesized silver nanoparticles have indicated less toxicity impact on normal cell line than cancerous cell line and have advocated the ramifications of silver nanoparticles in curing inflammations and tumour suspected afflictions. Additionally this investigation is a bench top model and may be explored further for the anti-inflammatory and wound recuperating application.

PCO-09

Diosmin Loaded Chitosan Nanoparticle: **Formulation and _in-vitro_ Characterization**

Sridevi Sangeetha Kothandaraman Sivaprakasam*[1], Umamaheswari Subburaya[1], Saravana Babu Chidambaram[2], Narayana Kalkura Sagari[3]

[1]Department of Pharmacology, Faculty of Pharmacy, Sri Ramachandra University, Porur, Chennai, Tamil Nadu, India

[2]Centre for Toxicology and Developmental Research, Sri Ramachandra University, Porur, Chennai, Tamil Nadu, India

[3]Crystal Growth Center, Anna University, Guindy, Chennai, Tamil Nadu, India

sangeethsb@gmail.com

Introduction: Flavonoids are natural products widely distributed in plant kingdom that gained lot of importance due to variety of biological effects relevance to numerous health care. It has been chosen as a drug molecule(s) and gained attention in the area of novel drug delivery system because of their disease preventing property and therapeutic expediency in multiple biological effects. Diosmin (D) is one of the most utilized flavonoid by pharmacological point of view being the active principle of many drug especially used in the treatment of blood vessel disease (hemorrhoidal diseases and venous disease), cancer, diabetic, colitis and liver disease. Diosmin is poorly soluble in water and limit its bioavailability.

Methods: The present work designed to improve the solubility and the bioavailability Diosmin by the developing a diosmin loaded chitosan nanoparticles. It was prepared by ionic gelation of tripolyphosphate and chitosan. The diosmin loaded chitosan nanoparticles were prepared in 10 batches and named as ND_1, ND_2, ND_3, ND_4, ……, ND_{10}. The formulated nanoparticles were characterized by dynamic light scattering (DLS), Zeta potential, Scanning Electron Microscopy and Fourier transform infrared spectroscopy (FT-IR). The *in-vitro* drug encapsulation efficiency and drug release were performed in the formulated nanoparticles.

Results: Among the different batches studied, ND_2 batch showed lowest mean particle size and highest zeta potential. Scanning Electron Microscopy of polymeric encapsulated diosmin nanoparticles morphology revealed that spherical in shape. *In-vitro* drug release study showed the diosmin loaded chitosan nanoparticles were capable of releasing drug in sustained manner.

Conclusions: It is concluded that, the developed Diosmin loaded chitosan nanoparticles might be used as vehicle for the improved solubility and prolonged delivery of Diosmin.

PCO-10

Characterization and Antimicrobial Efficacy of Pyocyanin Pigment Isolated from 10 Different Strains of _Pseudomonas aeruginosa_

Thukkaram Sudhakar*[1], Sundaramurthy Karpagam[2], Jayapal Premkumar[1]

[1]Faculty of Bio & Chemical Engineering, Sathyabama University, Chennai, Tamil Nadu, India

[2]Department of Plant Biology & Biotechnology, Queen Mary's College, Chennai, Tamil Nadu, India

drsudhakar35@gmail.com

Introduction: *Pseudomonas aeruginosa* is an opportunistic which belongs to the family Pseudomonadaceae. It is widespread in environment where in majority of which are responsible for noscomial infection. It has become a major threat in medical care and has drawn the attention of the microbiologist to combat and contain the spread of infectious diseases. The characteristic feature of *P. aeruginosa* is the production of various secondary metabolites such as pyocyanin pigment that exhibits antimicrobial properties

Methods: In this research work about fifty clinical isolates of *Pseudomonas aeruginosa* was collected from clinical laboratory Perambur. Optimization of the Pyocyanin pigment was done using various solid and liquid media followed by cross streak method of the pyocyanin pigment to find the antifungal efficacy of the pyocyanin pigment. The pigment was further subjected for extraction by choloroform solvent system and purification by chromatographic method. Then the characterization of pyocyanin pigment was done by various analytical studies such as UV spectral analysis, GCMS, NMR. Antimicrobial efficacy of the pyocyanin pigment was done by disc diffusion and MIC method followed by molecular analysis of pyocyanin gene.

Results: Among the fifty clinical isolates forty two isolates were confirmed as *P. aeruginosa*. These strains were used for the optimization of pigment production using nine different solid and liquid media. Among all pyocyanin yield was seen maximum in cetrimide agar and potato glycerol broth. Out of 42 strains, 10 strains were selected for further study based upon the pigment production and antifungal efficacy. These 10 strains were subjected for further study by extracting the pigment by using chloroform as a solvent system and subjected to spectral analysis using UV/visible spectrophotometer and an absorption peak was seen between 271 and 278 nm. It was then partially purified by column chromatography technique and the purity was determined by using TLC. Antimicrobial activity of the compound was determined by disc diffusion technique against bacterial pathogens and fungi which exhibited efficient antimicrobial activity by measuring the zone of inhibition and the results were found to be significant by two way anova analysis. The MIC range of the pyocyanin pigment was found between 40 and 60 μg/ml for fungi and 20 and 32 μg/ml for bacteria. The molecular weight of the pigment was determined by GCMS and the weight was found to be 210 kD. NMR studies revealed the presence of methyl group linked to condensed nitrogen aromatic ring. Genotypic confirmation of biosynthetic pyocyanin phz*a* gene was amplified by PCR using suitable primers. The amplified gene corresponded to 217 bp sequence.

Conclusions: Based upon the findings of the research work the novelty was found that pyocyanin, a secondary metabolite which possess antimicrobial efficiency. The pigment could be produced in large amount and could be applied in pharmaceutical industries after proper toxicity studies. Further the pigment could be modified for increased efficiency, by proper modification of the functional groups. The bacteria could survive in any environmental condition therefore it could be used as a bio control agent.

PCO-11

Screening of *In-vitro* Antioxidant Activity of *Solanum virginianum* Leaf Extracts

Sundar Sankaralingam*[1], Justin Koilpillai Yesudason[2]

[1]Department of Bio-Engineering, Sathyabama University, Chennai, Tamil Nadu, India

[2]Department of Botany, St. Joseph's College, Tiruchirappalli, Tamil Nadu, India

presundar@yahoo.co.in

Introduction: In modern years, much attention has been given to natural antioxidant and their association with health prosperity. Plants are important sources of natural antioxidants and produce various antioxidative compounds that have therapeutic effects. Antioxidant-based drug preparations are used for the prevention and treatment of many diseases. The aim of this study was to screen leaf extracts of *Solanum virginianum* to display potent antioxidant activity *in-vitro* to find possible sources for unique future antioxidants in food and pharmaceutical drugs.

Methods: A detailed study was performed on the antioxidant activity of the methanol, ethanol, petroleum ether, chloroform extracts of *Solanum virginianum* by *in-vitro* chemical analysis. The four major methods were employed to evaluate the antioxidant activity of *Solanum virginianum* are 2-Di Phenyl-1-Picryl Hydrazyl (DPPH), 2,2′Azino Bis (3-ethylbenz-Thiazoline-6-Sulfonic acid) (ABTS), nitric oxide and hydrogen peroxide free radical scavenging methods. Rutin and ascorbic acid were used as the standard drugs to compare the antioxidant activity of plant extracts.

Results: The IC_{50} values of ethanolic extract obtained based on the DPPH (12.60 μg/ml), ABTS (22.02 μg/ml) and nitric oxide (12.86 μg/ml), and hydrogen peroxide radicals (29.41 μg/ml) were lower showing potential antioxidant properties. In this study, Ethanolic extract of *Solanum virginianum* showed the highest antioxidant activity when compared with methanol, chloroform and petroleum ether extracts.

Conclusions: Further separation of active constituents present in the ethanol extract of *Solanum virginianum* will provide the pure compound with antioxidant activity to cure the different diseases.

PCO-12

***In-vitro* Antioxidant and Anti-Arthritic Activity of Certain Dihydroxy Flavones**

Umamaheswari Subburaya*, Sridevi Sangeetha Kothandaraman Sivaprakasam

Department of Pharmacology, Faculty of Pharmacy, Sri Ramachandra University, Porur, Chennai, Tamil Nadu, India

umacologist@gmail.com

Introduction: Flavonoids are polyphenolic compounds ubiquitously present in almost all parts of flowering plants. Many interesting pharmacological actions have been reported for this group of compounds. The dihydroxy flavones used in the present study includes 2′,3′-dihydroxy flavone and 2′,4′dihrdroxy flavones. They were synthesized using standard procedures at Research Organics, Chennai. The authenticities of these compounds were done with melting points and UV method.

Methods: Antioxidant activity was studied using DPPH method. Anti-arthritic effect of selected dihydroxy flavones was evaluated by *in-vitro* inhibition of protein denaturation model.

Results: 2′,3′-DHF and 2′,4′-DHF was and found to have significant antioxidant activity. IC_{50} was found to be 42 μg/ml and 45 μg/ml respectively. Both the compound showed significant anti arthritic activity. The percentage protection was found to be 61.8% (2′,3′-dihydroxy flavone), 68.6% (2′,4′-dihydroxy flavone) and 94.3% (diclofenac sodium).

Conclusions: 2′,3′-DHF and 2′,4′-DHF showed significant antioxidant and antiarthritic effect.

PCO-13

The *In-vitro* Evaluation of Alpha Glucosidase and Alpha Amylase Inhibitory Property of Bioflavonoids Extracted from *Oxalis corniculata*

Nazeebanihar Ubayathulla, Kaviya Selvaraj, Vasanthi Mani*

Department of Biotechnology, Kamaraj College of Engineering and Technology, Virudhunagar, Tamil Nadu, India

vasanthimadurai@gmail.com

Introduction: Medicinal plants are reservoirs of natural products with anti-diabetic potentials. On effective therapeutic

approaches to the treatment of DM, much effort is being made to investigate potential inhibitors against α-glucosidase and α-amylase from natural products. Sour plants routinely used in south Indian cuisine have the ability to inhibit alpha-amylase and alpha-glucosidase and could be used for the management of type II diabetes.

Methods: In this study optimized methanol extract of *Oxalis corniculata* was assessed for its alpha-glucosidase and alpha-amylase inhibitory effect and its mechanism of inhibition of the enzymes was evaluated. Further, the present study was designed to investigate the glucose uptake (antidiabetic activity) and antioxidant activity of optimized methanol extract of *Oxalis corniculata.*

Results: Optimized methanol extract of *Oxalis corniculata* inhibited alpha amylase activity in a mixed type close to the non-competitive manner, and inhibited alpha-glucosidase activity in a non-competitive manner, than Acarbose (a known alpha amylase and alpha-glucosidase inhibitor drug) which showed competitive inhibition. In, *in-vitro* glucose entrapment study the glucose released from dialysis tubing was determined by glucose oxidase kit. OMEOC showed an effect on the glucose movement. The results for reducing power activity were also comparatively higher.

Conclusions: Results of the present study provide the basis for the future use of *Oxalis corniculata* methanolic extract and its bioactive compound in the *in-vivo* system for the treatment and management of diabetes as well as in relative conditions of oxidative stress. Developing functional foods for diabetes would be a better idea to replace the synthetic drugs that are available for controlling diabetes.

PCO-14

Development and Characterization of Chitosan-based Antimicrobial Films Incorporated with Streptomycin Loaded Starch Nanoparticles

Neethu Hari, Ananthakrishnan Jayakumaran Nair*
Department of Biotechnology, University of Kerala, Thiruvananthapuram, Kerala, India
jekksnair@gmail.com, ajayakumarannair@gmail.com

Introduction: Organic films and coatings, especially those of natural polymers such as starch, chitosan, cellulose, lipid, protein etc are very attractive as biomaterial coatings because they offer great versatility in the chemical groups that can be incorporated at the surface. The relative ease of processing is another reason for the extensive interest in organic polymer films. Recently, increasing attention has been paid to develop and test functional polymer films with antimicrobial properties to use them for medical packaging and is ideal for overlay material that can be used to prevent bacteria growth on any surface requiring antimicrobial protection. Chitosan has exhibited high antimicrobial activity against a wide variety of pathogenic and spoilage microorganisms, including fungi, and Gram-positive and Gram-negative bacteria. Chitosan and its derivatives also have a significant role in food application area in view of recent outbreaks of contaminations associated with food products as well as growing concerns regarding the negative environmental impact of packaging materials currently in use.

Methods: The present work involves the development, characterization and antimicrobial activity of chitosan-based films incorporated with streptomycin loaded starch nanoparticles. Here the modified films were synthesized using film casting method and the films so formed were characterized by XRD, FT-IR and SEM. The releasing efficacy of streptomycin from these films were also investigated. We have evaluated the efficacy of chitosan film incorporated with streptomycin loaded nanoparticles over native streptomycin against different gram positive and negative pathogen through growth inhibition method.

Results: The modified chitosan film so obtained was transparent with slight yellow colour. The films were tough, durable and flexible. The XRD analysis of the film shows that the crystalline nature of film increased by the addition of streptomycin loaded starch nanoparticles. While FT-IR shows the presence of possible functional groups present in films and the surface morphology of modified chitosan film was studied using SEM analysis and it shows the homogenous structure with the presence of small crystals at the surface of film. The release study indicates that under optimum conditions, streptomycin loaded starch nanoparticles shows maximum loading efficiency of 60%. Streptomycin was observed to release out from film in a sustained way under physiological pH over a period of 10 days and these films have superior effectiveness compared to native streptomycin against different bacterial strain, resulting from the sustained release of streptomycin from the film.

Conclusions: Thus, film incorporated with streptomycin-loaded starch nanocrystals are identified as an ideal formulation due to their high drug encapsulation efficiency, high antibacterial efficacy at a low dose against different gram positive and gram negative pathogenic organism.

PCO-15

Research Projects at Post Graduate Level in Pharmacy

Gouri Anup Palsokar*, Madhukar Rajaram Tajne, Late Avinash Keshav Dorle
Department of Pharmaceutical Sciences, RTM Nagpur University, Nagpur, Maharashtra, India
gouripalsokar@gmail.com

Introduction: Research develops knowledge, skills and encourages the thinking process of an individual and more particularly students. As part of post-graduate pharmaceutical education, it develops the necessary skills among students which help them build their professional carriers and contribute towards the betterment of the healthcare industry and also society in general. Hence, it is essential and mandatory to carry out some appropriate research work which is relevant to the present day so that it can act as a bridge between innovation and utility with regard to patient care and compliances as requirement of post-graduate courses in Pharmaceutical Sciences in India and abroad. The primary objective of this study is to examine how the research at post graduate level in pharmacy could be carried out so that it benefits the students and make their research relevant to the current needs of the industry.

Methods: This study is based on a survey involving students perusing their post graduate education in pharmaceutical sciences, Ph.D. scholars, faculties of various pharmaceutical institutions and professionals from the pharmaceutical industry from within and outside India. Data was collected using a structured questionnaire and by taking personal interviews. The questionnaire for the survey was distributed personally as well as electronically. Multiple responses given by the respondents are also considered. The data collected was analyzed using appropriate tools.

Results: Among the 770 respondents, 45% (344) indicated that the students should carry out their projects in the industry. 10% (77) of respondents opined its execution in the academic institutions, 21% (161) stated that the students should carry out industrial projects in academic institutions and 42% (321) of the respondents preferred that the projects should be executed partly in academic institutions and partly in the industry. However 37% (126) students (M.Pharm and Ph.D.), 28% (38) of faculties and 61% (180) professionals from pharmaceutical industry indicated that Industrial projects should be conducted. 8% (28) students, 20% (27) faculties and 7% (22) professionals viewed that projects should be executed

in academic institutions. 22% (76) students, 30% (41) faculties and 15% (44) professionals from industry opined that industrial projects should be executed in academic institutions. 46% (156) students, 48% (65) faculties and 34% (100) professionals from pharmaceutical industry expressed that the research projects at M.Pharm level be executed partly in academic institutions and partly in industry.

Conclusions: In the current study, it appears that the research projects at post graduate level in pharmacy should be executed in pharmaceutical industry as well as in academic institutions (in collaboration). With appropriate training imparted in academic institutions coupled with a sound exposure to the best practices being followed in the industry, we can produce trained pharmacists who are readily employable.

PCO-16

Development of Novel Liquid Bandages for Effective Treatment of Inflammation and Wounds

Deveswaran Rajamanickam*[1], Bhanupriya Nara[1], Bharath Srinivasan[1]

[1]Department of Pharmaceutics, Faculty of Pharmacy, M.S. Ramaiah University of Applied Sciences, Bangalore 560054, Karnataka, India

deveswaran.ps.ph@msruas.ac.in

Introduction: Liquid bandage is a fluid composition which forms *in-situ* a protective or preventative covering, closure or seal for superficial and non-superficial cuts, scrapes, abrasions, burns, exposed tissues, open wounds and the like. The fluid composition is applied as a fluid-like, coatable formulation ultimately creating a flexible, protective seal on and around the affected area which lowers the probability of contamination and promotes fast healing.

Methods: The present study was aimed at developing dermatologically acceptable *in-situ* liquid bandages containing anti-inflammatory drugs. Polyvinyl Alcohol, Eudragit RL 100, Ethylcellulose and Nitrocellulose was used as the film forming polymers. Benzalkonium chloride was used as an antiseptic agent. The formulated liquid bandages were characterized by viscosity measurement, film thickness, tensile strength, adhesion strength, surface tack, drug content estimation and *in-vitro* drug release studies.

Results: The prepared liquid bandages were found to be opaque, compatible, possessing high drug content with sufficient viscosity and thickness. Pores were observed on the surface and texture was found to be rough. The *in-vitro* drug release studies revealed that the liquid bandages provide an immediate release of the drug. The antifungal *in-vitro* activity was carried out with the selected formulations incorporating an anti-fungal drug, Miconazole nitrate and the liquid bandages showed promising anti-fungal property. The selected formulations were tested for *in-vivo* animal studies for investigating the anti-inflammatory activity and wound healing activity in rat models. The data was analyzed statistically using Tukey–Kramer multiple comparison tests which indicated extremely significant anti-inflammatory and wound healing properties of the formulations as compared to control. The prepared formulations were found to be stable in rheological aspects during the stability study and were stable over a period of the year.

Conclusions: The results of this research work confirmed that the *in-situ* liquid bandages can be formulated with an active pharmaceutical agent that can be used for the effective management of wounds and inflammation.

PCO-17

Extraction of Fucose Containing Sulphated Polysaccharides from *Sargassum tennarimum* and its Anticoagulant and Antioxidant Activity

Manoj Saravana Guru Mohan, Vasanthi Mani, Anant Achary*

Centre for Research, Department of Biotechnology, Kamaraj College of Engineering and Technology, Virudhunagar, Tamil Nadu, India

achyanant@yahoo.com

Introduction: Marine algae are gaining importance as they are sources of several biomolecules with a diverse range of pharmaceutical properties. The coast of Mannar of Indian Ocean is rich in brown algae that have polysaccharides rich in fucose. In the present study, an attempt has been made to optimize the extraction condition for maximum yield of polysaccharide with diverse biological property from marine brown algae abundantly present in the coast of Tamil Nadu, India.

Methods: The fucose-containing Sulphated polysaccharides (FCSPs) from *Sargassum tennarimum* were obtained via different extraction procedures: by hot water extraction (HWE), ethanol precipitation (Eppt), fractional precipitation (Fpt), acidic extraction (A) and detergent mediated extraction (D). Chemical characteristics of these polysaccharide fractions were determined. The anticoagulant property and antioxidant property of the different polysaccharide fractions were evaluated.

Results: The FCSPs extracted using detergent have significantly higher contents of sugar, sulphate and fucose and lower contents of uronic acids, protein and polyphenols in comparison with FCSPs obtained by other extraction methods. All FCSPs exhibited total antioxidant capacity, the ferric antioxidant power value (FRAP), 1,1-diphenyl-2-pycrilhydrazyl (DPPH) radical scavenging activity, 2,2′-azino-bis 3-ethyl benzothiazoline-6-sulfuric acid (ABTS) radical-scavenging activity and superoxide radical scavenging activity. The FCSPs from detergent mediated extract showed higher heparinoid activity and anticoagulant activity compared to other extracts. A strong positive correlation between sulphate content in FCSPs and their heparinoid, anticoagulant and superoxide radical scavenging activity was found. Similarly, a positive correlation between polyphenol content and antioxidant activity was found.

Conclusions: The results of the study demonstrate that the detergent mediated extraction provides a higher yield of FCSP and contains high anticoagulant antioxidant property.

PC0-18

Pharmacokinetic Interaction Between Antacid and Commonly Prescribed Medications – Metformin, Diclofenac and Amoxicillin

Arjun Arumugam Ulganathan*, Geetha Lakshmi Gunasekaran, Ruckmani, Arun Kumar

Department of Pharmacology, Chettinad Hospital and Research Institute, Rajiv Gandhi Salai, OMR Chennai, Kelambakkam, Tamil Nadu, India

arjunarumugam@gmail.com

Introduction: Antacids are available as over the counter medications. They are commonly used self-prescribed medications. The use of antacids by ambulant patients may be ever increasing because they are freely available as over-the-counter drugs. Such antacid drugs may commonly be taken along with various prescribed medications owing to the nature of comorbidities and it is important to understand their influence in the pharmacokinetics of such drugs. The influence on the pharmacokinetics of a drug can have extreme clinical outcomes, ranging from treatment failure to toxicity.

Methods: This study was thus conceived with an intention to obtain information on the effect of antacids on the pharmacokinetics of a few commonly prescribed drugs. To investigate the impact of an antacid on the pharmacokinetic parameters of

commonly prescribed medications, Amoxicillin, Diclofenac, and Metformin, in adult male population following oral administration of the medications under fasting conditions. 18 Healthy human volunteers were recruited for the study with informed consent. Six volunteers were evaluated for Amoxicillin and antacid's effect on Amoxicillin; other 6 were evaluated for Diclofenac and antacid's effect on Diclofenac and last 6 were evaluated for Metformin and antacid's effect on Metformin. The subjects were randomized as per respective treatment periods. Clinical confinement and blood sampling was carried out as per IEC approved protocol under good clinical practice.

Results: The plasma samples were analyzed using a validated LCMS/MS bioanalytical method, for quantification of Amoxicillin, Diclofenac, and Metformin. Pharmacokinetic and statistical evaluation were conducted using WinNonlin Version 5.3 software. The 90% CI of C_{max} and AUC_{0-inf} for Amoxicillin, Diclofenac and Metformin were not within the acceptable limits of 80–125%.

Conclusions: Based on the results obtained, it can be concluded that the drugs; Amoxicillin, Diclofenac and Metformin do not show comparable pharmacokinetics when administered with antacids and that antacids significantly decrease the bioavailability of all drugs evaluated in this study.

PCO-19

Physicochemical Characterization of Chitosan Conjugated GnRH Nanoparticles for Estrus Synchronization in Kilakarsal Sheep

Sundara Vinayaki*[1], Gomathy[2]
[1]Department of Veterinary Physiology and Biochemistry, Veterinary College and Research Institute, Tirunelveli, Tamil Nadu, India
[2]Department of Veterinary Physiology, Madras Veterinary College, Chennai, Tamil Nadu, India
mvinayagi@gmail.com

Introduction: Sheep plays a major role in the security of small and marginal farmers in Tamil Nadu. Estrus synchronization (ES) or the induction of estrum in sheep is a valuable management tool available for improving fertility rate. Nanotechnology has begun to blossom in the field of reproduction and fertility. Chitosan provides the ability to sustain the release of active agents such as hormones due to its muco-adhesive nature. To the best of our knowledge to date, use of chitosan for fabrication of reproductive hormone nanoparticles has not been reported in small ruminants like sheep and goat. The purpose of this research is to improve the earlier ES systems to enhance ovulation rates, achieve higher estrus synchrony, and establish optimal doses of synchronizing agents, especially hormones.

Methods: The current research work was undertaken to induce estrus synchronization in Kilakarsal ewes, using chitosan nano conjugated GnRH and to assess its efficacy, safety and economic feasibility under semi intensive farming conditions by comparing the same with other known standard synchronization protocols. The chitosan nano conjugated GnRH was prepared by ionic gelation with high-pressure homogenization. A stock solution 1000 μg/mL of GnRH was prepared with water. The stock solution was then added to the chitosan nano particles solution in accordance with 1:4 (drug:carrier) ratio. After homogenization process the resulting mixture was subjected to Bradford assay to determine the total GnRH content, by measuring the protein concentration in the solution. The solution was then kept overnight in the refrigerator at 4 °C. Next day, the solution was centrifuged at 2000 rpm and the supernatant collected was again subjected to Bradford assay to determine the free GnRH concentration (mg/mL). Then the chitosan nano conjugated GnRH particles were subjected to size analysis by particle size analyzer, TEM, and AFM.

Results: The physicochemical characterization revealed that the particle size of the nanoparticles was in the range of 51.69 ± 3.58 nm, highest entrapment efficacy (EE) value of 82.55% and the polydispersity (PDI) of chitosan nano conjugated GnRH particles were found to be 0.117 and the net charge, i.e., zeta potential (ZP) of the nanoparticles was $(+)5.64 \pm 0.38$ mV. The nanoparticles synthesized in this study were also found to be compact, spherical, uniformly dispersed and stable as imaged by transmission electron microscopy (TEM) and atomic force microscopy (AFM)

Conclusions: The study suggests that zeta potential (ZP) of the nanoparticles was $(+)5.64 \pm 0.38$ mV and very low ZP values and may have poor storage qualities and may need to be prepared fresh and subjected to ultrasonication before use. It also indicated that lowest particle size, high PDI and EE % of the chitosan nano conjugated GnRH was ideal for induction of estrus synchronization in Kilakarsal sheep.

PTO-01

Phytochemical Screening and Evaluation of *Artemisia nilagirica* (*Clarke*) *Pamp* by GC–MS

Parameswari Pandian*[1], Devika Rengaswamy[2]
[1]Department of Biotechnology, Sathyabama University, Chennai, Tamil Nadu, India
[2]Department of Biotechnology, Aarupadai Veedu Institute of Technology, Paiyanoor, Chennai, Tamil Nadu, India
eshwari_2007@yahoo.com

Introduction: The knowledge and use of phytochemicals as medicine has begun from the very ancient era towards Ayurveda, Siddha and Unani. The significant increase of plant derived materials attributed development of new drugs and re-establishment of old ones according to the demands of mankind, various bioactive compounds are said to be efficient antibacterial, antiviral, fungicide, immunosuppressive, cytotoxic, algicidal etc. GC–MS analysis of *Spirulina platensis* acetone extract revealed seventeen compounds which included E-15, Hepatadecenal, Hascadecatrienoic acid, methyl ester, pentadecyl ester etc. In the present investigation, an attempt has been made to elucidate the bioactive compounds from the leaf extract of *Artemisia nilagirica* (*Clarke*) *Pamp*.

Methods: GC–MS technique was performed using GC SHIMADZU QP2010 system and gas chromatograph interfaced to a Mass Spectrometer (GC–MS) equipped with Elite-1 fused silica capillary column (length: 30.0 m, diameter: 0.25 mm, film thickness: 0.25 is composed of 100% dimethyl poly siloxane). An electron ionization energy system with ionization energy of 70 eV was used. Helium gas (99.999%) was used as the carrier gas at a constant flow rate of 1.51 ml/min and an injection volume of 2 l was employed (split ratio: 20). Injector temperature 200 °C; ion-source temperature 200 °C. The oven temperature was programmed from 70 °C (isothermal for 2 min), with an increase of 300 °C for 10 min. Mass spectra were taken at 70 eV; at a scan interval of 0.5 s with scan range of 40–1000m/z. Total GC running time was 35 min. Interpretation of mass spectrum GC–MS was conducted using the database of National Institute Standard and Technique (NIST08s), WILEY8 and FAME having more patterns.

Results: The GC–MS analysis showed that the major compounds were 15.19% of Ergosta-5,7,22-trien-3-o1, acetate, (3a, 22E) and the retention time was 11.24 and it was reported to be the highest composition among the compounds followed by 14.76% of Bufa-20,22-dienolide,3,14-dihydroxy-(3a, 5a) and the molecular weight was 386. Prednisone compounds was 10.65% and the retention time is 8.06 having minimum contribution from the rest of the compounds. Around 19 and 31 phytochemicals were registered in the leaf and flower methanolic extract of *Tagetes erecta Linn*. It was concluded that the maximum extract of

phytochemicals was observed in methanol extract of leaves which revealed that *Artemisia nilagirica* is highly valuable in therapeutic value for the treatment of various human ailments.

Conclusions: The leaf extract of *Artemisia nilagirica* (*Clarke*) *Pamp* revealed eight compounds through GC–MS analysis. The revealed bioactive compounds prove to have efficient medicinal values from various research work of different plant origin. Further confirmed research on isolation of particular active compounds will pave an authenticated proof of the therapeutic value of the plant.

PTO-02

Dissolution Enhancement of Celecoxib by Complexation with Glucosyl-β-Cyclodextrin-Choline Dichloride Coprecipitate

Kamal Dua*[1], Jyotsana R. Madan[2], Gaurav Gupta[3], Dinesh Kumar Chellappan[4], Satiko Kikuchi[5], Terezinha de Jesus Andreoli Pinto[5]

[1]School of Pharmacy and Biomedical Sciences, The University of Newcastle, Newcastle, Callaghan NSW, Australia

[2]Department of Pharmaceutics, Sinhgad Technical Education Society's, Smt. Kashibai Navale College of Pharmacy, Pune, Maharashtra, India

[3]The University of Newcastle, Newcastle, Callaghan NSW, Australia

[4]School of Pharmacy, International Medical University, Kuala Lumpur, Malaysia

kamalpharmacist@gmail.com

[5]Department of Pharmacy, Faculty of Pharmaceutical Sciences, University of São Paulo, Av. Prof. Lineu Prestes, 580, CEP 05508-900, São Paulo, SP, Brazil

Introduction: The objective of the present investigation is to study the *in-vitro* dissolution effects of choline dichloride (CDC) co-precipitation of glucosyl-β-cyclodextrin (G1-β-CD) molecular inclusion complexed Celecoxib (CXB).

Methods: The molecular inclusion complexes of CXB with Gl-β-CD co-precipitated with CDC were prepared using different methods. Physicochemical characterization and *in-vitro* dissolution of pure drug, physical mixtures and inclusion complexes were carried out.

Results: Phase solubility studies of CXB-Gl-β-CD systems in water at 25 °C exhibited typical A_L-type solubility curve. Low values of standard deviation in drug content of cyclodextrin inclusion complexes indicated uniform drug distribution. The average particle size of the RV-Gl-β-CD complexes was found to be within the range of 59.3–74.2 μm. The scanning electron microscopy revealed the appearance of binary systems as agglomerates, exhibiting the amorphous nature of the multi-component systems. FT-IR spectroscopy and DSC studies indicated no interaction between CXB and Gl-β-CD-CDC. Molecular inclusion complexes of CXB with co-precipitated Gl-β-CD showed considerable increase in the dissolution rate in comparison with physical mixture and pure drug in 0.1 N HCl, pH 1.2 and phosphate buffer, pH 7.4. Dissolution enhancement was attributed to the formation of water soluble inclusion complexes with the precipitated form of Gl-β-CD. The *in-vitro* release from all the formulations was best described by first order kinetics followed by Higuchi release model.

Conclusions: In conclusion, due to the dual phenomenon of co-precipitation and formation of stable molecular inclusion complex of CXB with Gl-β-CD in the presence of CDC, the dissolution profile was enhanced significantly, which in turn have potential to produce a faster onset of action and assists in dose reduction.

PTO-03

Development and *In-vitro* Release Profile of Curcumin Loaded Solid Lipid Nanoparticles

Senthil Kumar Periyathambi*[1], Punniamurthy Natesan[2]

[1]Department of Veterinary Pharmacology and Toxicology, Veterinary College and Research Institute, Orathanadu, Tamil Nadu, India

[2]Ethnoveterinary Herbal Training and Research Centre, TANUVAS, Thanjavur, Tamil Nadu, India

p.senthilkumar@tanuvas.org.in

Introduction: Curcumin or diferuloylmethane is a yellow hydrophobic polyphenol derived from the rhizome of turmeric, *Curcuma longa* (*Zingiberaceae*). Curcumin had many potential pharmacological effects including anti-inflammatory, antibacterial, antioxidant and anticancer activities. It was also proved against cardiovascular disease, Alzheimer's disease, liver problems, rheumatic arthritis, diabetics, Parkinson's disease and neurological disorders. Despite the therapeutic potential of curcumin, its extremely low aqueous solubility, rapid metabolism, low gastrointestinal absorption, and degradation at alkaline pH limit curcumin bioavailability and clinical efficacy. Development of efficient drug delivery system for curcumin would be a potential approach to improve its bioavailability and clinical efficacy. The solid lipid nanoparticles (SLNs) are the most effective lipid-based colloidal carriers system have potential in delivering the drugs with poor water solubility and therapeutic efficacy. Hence, in the present study, it is planned to develop a method for the preparation of curcumin loaded solid lipid nanoparticle intending to improve its aqueous solubility, bioavailability and clinical efficacy.

Methods: The SLNs were prepared by a hot homogenization coupled with ultrasonication method using tripalmitin, tween 80, span 80 and polyvinyl alcohol. The optimized blank SLNs formulations were utilized to entrap curcumin and characterized for particle size, polydispersity index, zeta potential, shape, drug encapsulation efficiency, and *in-vitro* drug release. The prepared SLNs were analyzed by FT-IR spectroscopy to confirm the cross-linking reaction between drug, lipid and surfactants.

Results: The results demonstrated that the particle size, polydispersivity index, zeta potential, encapsulation efficiency and loading capacity of the SLNs were 214.60 ± 3.55 nm, 0.49 ± 0.03, -29.63 ± 0.50 mV, $51.99 \pm 4.14\%$ and $5.33 \pm 0.34\%$, respectively. AFM images represented that the particles were ranging from 170 to 225 nm and well dispersed with smooth surfaces. The release profile of the curcumin SLNs was an initial burst release of 16.5% within 2 h followed by sustained release over 96 h. From the IR spectra, it was clear that the nanoformulation was the only physical mixture, and there was no interaction between lipid and surfactants.

Conclusions: From the study, it can be concluded that curcumin was successfully incorporated into tripalmitin-SLNs by a hot homogenization coupled with ultrasonication method. The physico-chemical study of curcumin loaded tripalmitin SLNs showed desired particle size, PDI, zeta potential, LC and encapsulation efficiency. The curcumin SLNs had a sustained release effect in the *in-vitro* release study. FT-IR study concluded that no interaction occurred between the drug excipients and polymer used in this study.

PTO-04

Synthesis, Molecular Characterization and Evaluation of *In-vivo* Hepatoprotective Activity of Some Novel Oxadiazole Derivatives

Asish Bhaumik*[1], M. Chinna Eswaraiah[2]

[1]Department of Pharmaceutical Chemistry, Teja College of Pharmacy, Kodad, Nalgonda (Dist.), Telangana 508206, India

[2]Department of Pharmacognosy, Anurag Pharmacy College, Ananthagiri, Kodad, Nalgonda (Dist.). Telangana 508206, India.

bhaumik.asish@gmail.com

Introduction: The main objective of the present work was the synthesis of N-(4-{[5-(substituted phenyl)-1,3,4-oxadiazol-2-yl] methoxy}phenyl)acetamide and to evaluate the hepatocytes regenerator potentiality by molecular docking with 2V2T-NF-KB and as well as *in-vivo* methods. The nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB) pathway is critical in inflammation, proliferation and carcinogenesis. There exist three main players in this pathway. The inhibitor of NF-κB (IκB), IκB kinase (IκK)-NF-κB essential modulator (NEMO) complex and NF-κB. The IkK-NEMO complex activates NF-κB via phosphorylation of Iκβ and, eventually, leads to its proteasomal degradation. This leads to nuclear translocation of NF-κB and activation of target genes, such as cyclooxygenases and interleukins. The identification of anti-inflammatory compounds might be an effective strategy to target inflammatory disorders and cancer.

Methods: The final target compounds (AB1–AB8) were synthesized by reflux condensation by reacting paracetamol, ethyl chloroacetate, hydrazine hydrate and various benzoic acids and TLC method was used to check purity of compounds. TLC plates are pre-coated silica gel (HF254-200 mesh) aluminum plates, ethyl acetate: n-hexane was used as eluent and visualized under UV chamber. The melting point of synthesized compounds was determined by open capillary tube and the synthesized compounds were characterized by IR, NMR, and Mass spectroscopy and for molecular docking crystalline structure of the target protein NF-KB with PDB id 2V2T was retrieved from protein data bank and protein clean-up process was done and essential missing hydrogen atom were been added. Different orientation of the lead molecules AB1 to AB8 along with standard drug silymarin with respect to the target protein was evaluated by Autodock program and the best dock pose was selected based on the interaction study analysis. The *in-vivo* Hepatoprotective activity was carried out by using albino rats where CCl_4 was used as a hepatotoxin.

Results: Most of the scoring functions in molecular docking are physics-based molecular mechanics force fields that estimate the energy of the binding pose; a low (negative) energy indicates a stable system and thus a likely binding interaction. Molecular docking is performed to find out the binding affinity or molecular interaction energy (kcal/mol) of docked compounds. Lowest (negative value) energy of docked molecule indicates high binding affinity with the target protein/compound. *In-silico.* molecular docking studies displayed the binding energies: −5.17, −5.52, −5.40, −4.60, −4.60, −4.87, −3.42, −3.85 kcal/mol, of the synthesized compounds (AB1–AB8) which indicated that the compound had high binding affinity towards the 2V2T-NF-KB protein and inhibit the NF-KB protein function in comparison with std. drug silymarin (−3.54 kcal/mol). The *in-vivo* experimental data displayed that the elevated levels of SGOT, SGPT, ALP and Sr. bilirubin were mainly due to CCl_4 intoxication, reduced significantly ($*P < 0.05$) in rats, after treatment with synthesized compounds. Treatment with a synthesized compounds (AB1–AB8) at a dose of 250 mg/kg b.w. decreased the SGOT: 10.76%, 8.74%, 9.08%, 7.16%, 9.58%, 6.61%, 11.65%, 7.80%, SGPT: 23.30%, 23.35%, 22.87%, 23.78%, 23.20%, 22.87%, 23.01%, 23.92%, ALP: 10.18%, 9.92%, 10.30%, 10.20%, 9.33%, 10.56%, 8.80%, 9.56% and serum bilirubin levels by 36.98%, 42.46%, 46.57%, 36.98%, 38.35%, 42.46%, 36.98%, 38.35%, (significantly) respectively, while at higher dose of 500 mg/kg b.wt. was more effective, causing a reduction of SGOT: 25.33%, 24.69%, 24.83%, 23.85%, 24.69%, 23.75%, 26.22%, 24.19% SGPT: 42.26%, 41.69%, 41.97%, 42.39%, 41.54%, 41.49%, 41.40%, 42.40%, SALP: 22.66%, 22.58%, 22.58%, 22.35%, 22.35%, 22.56%, 22.30%, 22.33%, and Sr. bilirubin: 54.79%, 55.10%, 57.46%, 57.68%, 53.51%, 55.83%, 55.04%, 53.85%. Silymarin was used as standard drug showed a significant reduction of level of SGOT: 54.79%, SGPT: 47.61%, SALP: 60.39% and Sr. bilirubin: 78.08% respectively receiving CCl_4 alone.

Conclusions: The above experimental data concluded that the synthesized compounds had the potential hepatocytes regenerator ability as shown *in-vivo* and *in-silico*. Molecular docking studies of synthesized compounds were revealed comparable binding energies and similar docking poses on target proteins such as 2V2T-NF-KB and known to be inhibitors of NF-KB.

BTO-01

ADJ6, A Polyherbal Formulation Alters Glucotoxicity Induced mRNA Expression in RIN5F Cells-An *In-vitro* Study

Anand Duraiswamy[1], Changam Sheela Sasikumar*[2], Sanjay M Cherian[2], Kooturathu Mammen Cherian[2]

[1]Department of Cellular & Molecular Biochemistry, Frontier Mediville (Affiliated to University of Madras), Chennai, Tamil Nadu, India

[2]Department of Cardio-Thoracic Surgery, Frontier Lifeline Hospital, Chennai, Tamil Nadu, India

sheelsasic@yahoo.co.in

Introduction: Type II diabetes mellitus is mainly characterized by three factors namely hyperglycemia, insulin resistance and defective insulin secretion. It is also implicated that WNT signalling pathway is closely linked to the development of Type 2 diabetes and in the pathogenesis of pancreatic β-cells. It has been reported that WNT effector β-cat/TCF through the canonical pathway regulates various signalling molecules important for metabolic and insulin cascades. Previously, we have described that ADJ6 may play in altering TCF7L2 mRNA expression and may reduce apoptosis of pancreatic β-cells, *in-vitro.*

Methods: In the present study, we aim to study further the changes in the mRNA expression of WNT Signalling pathway genes during glucotoxicity condition and upon treatment with the polyherbal formulation, ADJ6 on pancreatic β-cells (RIN5F model), *in-vitro.* RIN5F cells were cultured in a medium containing 11.1 mM glucose. Then the cells were introduced to medium containing 40 mM Glucose for 2 h to induce glucotoxicity condition. Followed by which the cells were treated with ADJ6 for 48 h. Cells cultured 11.1 mM glucose and 40 mM glucose served as control. mRNA expression of INS1, WNT5B, WNT10B, β-catenin, c-Myc, PDX1 and NeuroD1 was assessed using RT-PCR. Nitric oxide was estimated quantitatively estimated using Griess Method.

Results: WNT5B, β-catenin and c-myc mRNA expression were up-regulated in cells treated with 40 mM glucose when compared to cells treated with 11.1 mM glucose and ADJ6. However, WNT10B showing no change in expression in any of the treatment groups. Expression of INS1 was marginally up-regulated in ADJ6 treated cells. Further expression of PDX1 and NeuroD1 was found to be up-regulated in ADJ6 treated cells. Surprisingly, the levels of nitric oxide showed a fourfold increase in the cells treated with 40 mM glucose (4.385 ± 0.050 μg/ml) but was not elevated in the cells treated with ADJ6 treatment (1.650 ± 0.022 μg/ml) and cells cultured in 11.1 mM glucose (1.553 ± 0.016 μg/ml).The results may indicate that during glucotoxicity, key WNT signalling pathway genes and increased nitric oxide levels may promote factors leading to apoptosis of β-cells.

Conclusions: The study also suggests that ADJ6 may promote factors associated with β-cells functioning by inducing PDX1 and NeuroD1 expression. Hitherto exact mechanism unknown, further extensive studies are required to demonstrate the effectiveness against hyperglycaemia, its gene altering mechanisms and the ability to preserve β-cell function.

BTO-02

Role of Nanomedicine in Immunotherapy

Bharti Mittal*[1], Bhaskar Vishwanathan[2]

[1]Department of Molecular Genetics & Stem Cell Research, Vydehi Institute of Medical Sciences & Research Center, Whitefield, Bangalore, Karnataka, India
[2]Department of Radiation Oncologist, Vydehi Institute of Medical Sciences & Research Center, Whitefield, Bangalore, Karnataka, India
counseler4genetics@gmail.com

Introduction: Every year more than a million cancer cases are diagnosed and treated. The clinical manifestation and metastatic complications of cancer are often devastating. Surgery, chemotherapy, and radiation treatments are the currently most commonly employed therapies. All these methods have substantial adverse side effects and can damage the surrounding tissues or incomplete eradication of the cancer. Years of intense research and billions of dollars in spending have dramatically increased our knowledge of the causes and biology of cancer, leading to the development of many improved treatment strategies. An estimated 7.5 million deaths in 2008 alone were caused by cancer, signaling the pressing need for newer, even more, effective therapies.

Methods: Current cancer therapies are largely limited by the (i) inability to bypass biological barriers, (ii) nonspecific delivery and poor bio distribution of drugs, (iii) ineffectiveness against metastatic disease, (iv) drug resistance of cancers and (v) lack of an effective modality for treatment monitoring. Nanotechnology with immunotherapy offers the means to aim therapies directly and selectively at cancerous cells. Immunotherapy is a promising option for cancer treatment to cure with limited side effects by primarily activating the host's immune system. The immune system can recognize and kill pre-cancer and cancer cells. Cancer immunotherapy develops strategies toovercome the problems of escaping of tumor cells survival after immune-selection. The effect of traditional immunotherapy is satisfactory due to tumor escape and resistance of multiple mechanisms.Pharmaceutical nano medicine in cancer immunotherapy has provided a practical solution to solve the limitations of traditional immunotherapy including nano-diagnostics.

Results: The nano-carriers (including micelles, liposomes, polymer–drug conjugates, solid lipid nanoparticles and biodegradable nanoparticles) can be used for the cellular transfer of immune effectors for active and passive nano immunotherapy. Application of immune cell-based therapy in routine clinical practice is challenging due to the poorly understood mechanisms underlying success or failure of treatment.DNA, RNA, peptides, proteins and small molecules can all be used as cancer therapies when formulated in nano-carriers. Currently, cancer vaccines are applied in treatments with existing cancer or to prevent the development of cancer in certain high-risk individuals. Most of the non-specific immune activation agents include adjuvants that enhance immunogenicity and accelerate and prolong the response of cancer vaccines.

Conclusions: The carriers of vaccines, such as viruses and nanoparticles, have also been in clinical studies for many years. In cancer nano-diagnostics, it looks for specific “molecular signatures” in cancer cells or their microenvironment by using genomics and proteomics. Development of accurate and quantitative imaging techniques for noninvasive cell tracking can provide essential knowledge for elucidating these mechanisms e.g., the labeling of T-cells with gold nano particles can be used for cell tracking with CT offers a valuable tool for research, and more importantly for clinical applications, to study the fate of immune cells in cancer immunotherapy.Nanoparticles can be applied as contrast-enhancing agents in various optical imaging techniques, such as optical coherence tomography, fluorescence imaging, optical reflectance microscopy and recently, optoacoustic imaging. There is a need to establish relationships between the tumor and the immune system and the strategies used in eliminating tumors by using nanomedicine in combination with immunotherapy.

BTO-03

Extraction, Estimation and Characterization of Biomolecules from Endophytic Fungi

Kilavan Packiam Kannan*, Madhankumar Dhakshinamoorthy, Senthamarai Manogaran
Department of Biotechnology, Bannari Amman Institute of Technology, Sathyamangalam, Tamil Nadu, India
drkpkannan@gmail.com

Introduction: Endophytic fungi are defined as those that live symptomatically within the tissues of higher healthy plants. These fungi can produce a plethora of secondary metabolites and came in lime light after the discovery of Taxol. The potential of endophytic fungi is well established, but its translation into commercial level production is yet to be explored.

Methods: The main focus of our research activity is on the discovery of bioactive metabolites form endophytic fungi isolated from medicinal plants of Sathyamangalam forest which offer a great opportunity to discover unexplored fungi with pharmaceutical potential. Camptothecin one of the most important antineoplastic agents extracted from plant sources naturally occurring group of quinoline alkaloids depicting profound cytotoxic activity. In this present study, we have isolated endophytic fungi from medicinal plants and selected endophytic fungal strains were screened for the ability to produce camptothecin under-fulfilled parameters in the laboratory.

Results: The selected endophytic fungal strains *Pestalotiopsis* sp., *Phyllosticta* sp., and *Colletotrichum crassipes*, were grown in a various semi-synthetic liquid medium like Potato Dextrose Broth, Sabaroud Dextrose Broth, Malt Extract Broth, etc., for the production of Camptothecin. The mycelia and broth were separated by filtration. Mycelial mat was dried and the secondary metabolite extracted by using various organic solvents like dichloromethane and chloroform. The crude and solvent were separated by rotary evaporator and the dried crude sample was analyzed by of TLC, HPTLC, HPLC, FTIR, etc.

Conclusions: The chromatogram was compared with standard camptothecin and confirmed the production of camptothecin. The results will be discussed in detail.

BTO-04

Bioinformatic Approaches to Identify Potential Therapeutic Marine Metabolites Against Ocular Pathogen *Chlamydia trachomatis*

Umadevi Subramanian[1], Premkumar Kumpathi[2], Ayyasamy Pudukadu Munusamy[3], Rajakumar Sundaram*[1]
[1]Department of Marine Biotechnology, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India
[2]Department of Biomedical Sciences, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India
[3]Department of Microbiology, Periyar University, Salem, Tamil Nadu, India
kodairaj@gmail.com

Introductions: Granular conjunctivitis is one of the leading causes of infectious blindness in the world. It is caused by *Chlamydia trachomatis* bacterium that produces a characteristic roughening of the inner surface in eyelids. Though drugs have been identified so far, none gives the successful remedy. In recent years, genome-sequencing projects of pathogens and bioinformatic techniques have revolutionized microbial drug target identification.

Methods: In this work, codon adaptation index (CAI) was used as a measure to predict the frequency of codon usage in the highly expressed genes and is coupled with other proteome analysis for mining potential drug targets. The chosen genes were filtered against non-homologous to human proteins. The functional significance, sub-cellular location and other parameters were used to narrow down the target. On the other hand, the drug molecules were screened from marine secondary metabolites. The compounds were collected from a literature search in PubMed database by keyword through 'AND' and 'OR' Boolean operators. Then, they were screened for the drug-likeness property by the software DruLiTo and the quantitative estimate of drug-likeness (QED) were calculated.

Results: Five therapeutic targets were identified from the results, among ATPase DnaA and DNA polymerase III subunit alpha could be the good drug targets as they are involved in essential functionalities viz. DNA replication and regulation. Also, for quick permeable drugs, oligopeptide-binding proteins namely replicative DNA helicase, DNA polymerase-I and protein translocase subunit were identified. These are located in periplasmic membrane further, they are involved in ion transport, which are essential for the survival of the organism. From QED estimation, two marine compounds asperic acid and chloriolin A were identified as effective drug lead.

Conclusions: The molecular docking studies of those marine compounds with the therapeutic target revels that chloriolin A from Jaspis marine sponge may act effectively against *C. trachomatis*. Further it should be experimentally validated and another notable plan is the combinatorial therapy of chloriolin A with already identified drug which targets replication proteins may have much effectiveness.

BTO-05

Mesenchymal Stem Cell Therapy for Diabetic Foot Ulcer

Venkatesh Subrmanian[1], Ramachandran Perumal[2], John Vennison Susai Marrion*[1],

[1]Department of Biotechnology, Anna University, BIT Campus, Tiruchirappalli, Tamil Nadu, India

[2]Tiruchirappalli Institute of Regenerative Medicine (TIRM), Tiruchirappalli, Tamil Nadu, India

johnvennison36@gmail.com

Introduction: Mesenchymal stem cells (MSCs) hold great promise for therapeutic application in non-healing ulcers and tissue regeneration because of their multi-lineage differentiation potential. Infused MSCs may migrate to the sites of injury and improve wound healing by stimulating angiogenesis and promoting revascularization.

Methods: The incidence of diabetic footulcers is increasing worldwide. Diabetic foot ulcers are a significant and rapidly growing complication of diabetes. Over half of diabetic patients who develop a single ulcer will subsequently develop another ulcer of which the majority will become chronic non-healing ulcers. They are the most common foot injuries leading to lower extremity amputation.

Results: The most common risk factors for ulcer formation include diabetic neuropathy, structural foot deformity and peripheral arterial occlusive disease. MSCs have a multidirectional differentiation potential and differentiate into cell types normally derived from endoderm or ectoderm. Their easy accessibility and strong *in-vitro* expansion ability, made them as an ideal cell source for autologous stem-cell-based replacement therapies.

Conclusions: An emerging paradigm suggests that MSCs alter the tissue microenvironment via paracrine signaling to induce angiogenesis, alter immune cell function, block inflammation, and stimulate growth of host cells to affect tissue repair. Here, we report a case study with one such case.

MCO-01

Detection of Anti-Hyperglycaemic Trace Elements in Polyherbal Formulation (ADPHF6) by ICP- OES, SEM-EDAX and LIBS analysis – A Brief Comparative Study

Devanand Shanmugasundaram[1], Rohit Kumar[2], Awadhesh Kumar Rai[2], Changam Sheela Sasikumar*[1], Sanjay M. Cherian[3], Kotturathu Mammen Cherian[3]

[1]Department of Cellular & Molecular Biochemistry, Frontier Mediville (Affiliated to University of Madras), Chennai, India

[2]Laser Spectroscopy Research Laboratory, Department of Physics, University of Allahabad, Allahabad, India

[3]Department of Cardio-Thoracic Surgery, Frontier Lifeline Hospital, Chennai, India

sheelsasic@yahoo.co.in

Introduction: World Health Organization (WHO) and several governing bodies have urged the practice of natural based alternative therapy for their daily primary health care needs. At present, even though numerous anti-hyperglycaemic herbal products are in practice, less evidence sighting the role of trace element and heavy metals has been reported. In living tissues, negligible levels of trace elements are sufficient to uphold the vital physiological process and initiate the numerous enzymatic reactions. Variation in levels of essential elements including calcium (Ca), potassium (K), magnesium (Mg), zinc (Zn), manganese (Mn) during metabolic profiling are often associated with diabetic or prediabetic condition.

Methods: Our present study, designed to deliver comprehensive evidence about existence of anti-hyperglycaemic elemental composition in our polyherbal formulation, ADPHF6 using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES), Scanning electron microscopy with an energy dispersive X-ray analytical system (SEM-EDAX) & Laser Induced Breakdown Spectroscopy (LIBS) analysis.

Results: ICP-OES analysis demonstrated, copper (Cu) 22.59 ± 0.01 mg/kg and zinc (Zn) 22.44 ± 0.02 mg/kg as major percentage of microelement; while calcium (Ca) 0.10 ± 0.01 mg/kg measured with minimal concentration. From the SEM-EDAX analysis, carbon (C) and oxygen (O) were computed to be 55.72 ± 0.01 wt% and 34.58 ± 0.01 wt% major peak among the elemental profile, however sodium (Na) recorded with least count of 00.12 ± 0.01 wt%. Under optimized conditions, LIBS spectra of ADPHF6 polyherbal formulation was recorded and trace elements was calculated by calibration free LIBS method. From LIBS analysis iron (Fe II) and calcium (Ca I) ions are measured to be in maximum level with $616.8 \pm 0.1\%$ and $341.2 \pm 0.01\%$ respectively; while other trace elements are measured to be in significant concentration. Heavy metals viz. arsenic (As), cadmium (Cd), mercury (Hg), selenium (Se) and tin (Sn) were recorded as ND: not detected/LOQ: limit of quantification in ADPHF6 sample from the above mentioned analysis.

Conclusions: Current findings suggest the existence and its therapeutic role of essential trace elements in polyherbal formulation, which are prerequisite to maintain glucose homeostasis. The results also validate the detection of multi elemental analysis in solid samples by LIBS based tool are more precise as compared to ICP-OES and SEM-EDAX and can be applied for screening various herbal materials for the same.

MCO-02

Synthesis and Biological Properties of Poly-L-(lactic acid)/ Chitosan Modified Montmorillonite Nanocomposite Films

Surumi Beevisha[1], Tincy Kunnathu Thomas[2], Neethu Hari[2], Ananthakrishnan Jayakumaran Nair*[2],
[1]Centre for Nanoscience and Nanotechnology, University of Kerala, Thiruvananthapuram, Kerala, India
[2]Department of Biotechnology, University of Kerala, Thiruvananthapuram, Kerala, India
jekksnair@gmail.com, ajayakumarannair@gmail.com

Introduction: Nanotechnology in tissue engineering involves the use of nanomaterials, which can mimic surface properties (including topography, energy, etc.) of natural tissues. Poor mechanical property of chitosan limits its usage in the field of tissue engineering hence it was combined with poly-L-(lactic acid) (PLLA), especially in the surface and inside the pores, so chitosan can interact more directly with cells,whereas PLLA provides both mechanical strength and stiffness to the biodegradable structure. Drop of pH resulting from the PLLA degradation was minimized by buffering activity of chitosan.

Methods: Characterization of nanocomposite was done using UV, XRD, and AFM analyzes. Drug loading ability and *in-vitro* drug release was also checked. Antibacterial efficiency of the film was analyzed using three bacterial strains namely Esherichia coli, Bacillus subtilis and Staphylococcus aureus by growth kinetics method. Biological properties were studied by using a two-dimensional culture method involving 3T3 mouse fibroblast cells. The optical property of film was analyzed using ultraviolet–visible spectroscopy. The structure of the prepared nanostructured film was investigated by XRD. AFM analysis of nanocomposite film was also done.

Results: Drug loading ability and *in-vitro* drug release showed relatively controlled pattern. Film samples showed greater antibacterial efficiency. Two-dimensional culture method showed that the fibroblast cells got attached to the nanocomposites to a significantly higher degree and subsequently proliferated more. The optical property of film showed an absorption maximum of 294 nm. An average grain size of about 4.38 nm was obtained by X-ray diffraction analysis. AFM analysis revealed the nanotopography of film sample.

Conclusions: AFM analysis of nanocomposite film was done for the better understanding of molecular assembling; images depict the surface topography of nanostructure that can be used for tissue engineering applications. Based on these findings, the biomimetically synthesized nanocomposite film is believed to be potentially useful in biomedical and tissue engineering fields.

Poster Presentations

PCP-01

Antidiabetic Potential of Herbal Capsules Containing *Trigonella foenum Graecum* Seed Extract

Divya Jyothi*[1], Marina Koland[2]
[1]Department of Pharmacognosy, Nitte Gulabi Shetty Memorial Institute of Pharmaceutical Sciences, Deralakatte, Karnataka, India
[2]Department of Pharmaceutics, Nitte Gulabi Shetty Memorial Institute of Pharmaceutical Sciences, Deralakatte, Karnataka, India
divya.jyothi84@gmail.com

Introduction: Diabetes mellitus, commonly known as diabetes, is one of the world's oldest known diseases. Despite considerable progress in the treatment of diabetes search for newer drugs continues as the existing synthetic drugs fails to maintain euglycaemia, controlling long term microvascular, macrovascular complications and provide economic burden particularly to the rural population across the globe. Since diabetic mellitus (DM) is a multifactorial disease, the available pharmaceuticals, despite their sensible treatment, target mostly one pathway to control hyperglycemia and encounter several side effects. Therefore new therapeutic paradigms aim to hit several pathways using only one agent. Traditionally, antidiabetic plants and /or their active constituents may fulfil this need and one of them is fenugreek or *Trigonella foenum*. The anti-diabetic effect of fenugreek seeds has been granted to the presence of amino acid 4-hydroxyisoleucine alkaloid trigonelline, coumarins, steroid saponins and fibre content in the seed which are said to act by several mechanisms. Since fenugreek contains multiple antidiabetic constituents, the present study was designed to formulate capsule formulations containing crude extract of fenugreek seeds in order to obtain antidiabetic formulations with more effective oral hypoglycemic activity, less side effects, increased patient compliance thereby providing multifaceted benefits.

Methods: Capsule formulations (F1, F2, F3, F4) were prepared by encapsulation of granules prepared from the fenugreek seed extract with various concentration of sodium starch glycolate as superdisintegrant (0%, 2%, 3%, 5%) into hard gelatin capsule. Flow properties of prepared granules were assessed by determination of bulk density, tapped density, Carr's index, Hausner ratio. Finished capsule formulations were subjected to physicochemical characterization, *in-vitro* drug release and stability studies as per ICH guidelines. The oral antidiabetic activity of the selected capsule formulations (F1, F4) were screened against streptozotocin induced diabetes mellitus in rats and results were compared with the antidiabetic activity of capsule formulation containing crude fenugreek seed powder (F0).

Results: Fenugreek capsule formulations pass the test for weight variation since the percentage deviation of individual weight of capsule from mean were found within $\pm 7.5\%$. Drug (trigonelline) content of all the capsule formulations was more than 85%. Disintegration time of formulations F1, F2, F3, F4 was found to be 15, 10, 9, 7 min respectively. Percentage release of trigonelline from capsule formulations F2, F3, F4 was more than 90% except formulation F1 which showed only 77.06 ± 1.01 after 6 h of dissolution study. Comparison of dissolution profile showed that extent of drug release from prepared capsule formulation containing fenugreek extract was more when compared to capsule containing fenugreek powder (F0) which showed only 50% drug release after 12 h. Prepared Capsule formulations were found to possess good stability on storage up to 3 months as indicated by the stability testing. Antidiabetic activity studies indicated that capsules F1, F4 significantly ($p \leq 0.001$) reduced the blood glucose level in diabetic rats by 58.90% and 64.72% respectively after 15 days of treatment when compared to diabetic control group. The antidiabetic effect of capsule F4 formulations was found to be comparable to that of the effect exerted by the reference drug, Glibenclamide at the dose of 0.5 mg/kg. Capsule formulations containing fenugreek extract was found to be more effective as antidiabetic agent than capsule formulation containing crude fenugreek seed powder which showed only 52.05% reduction in blood sugar level after 15 days of treatment.

Conclusions: Formulation of fenugreek seed extracts into suitable and appropriate herbal dosage form may be more desirable, advantageous and therapeutically more beneficial than incorporating the direct plant materials for the treatment of diabetes.

PCP-02

Screening of Phytochemical Compounds from *Turbinaria conoides* using TLC, UV–vis and FT-IR Analysis

Jayabarath Jayaraman*, Jeyaprakash Karuppaiah
PG & Research Department of Biochemistry, Rajah Serfoji Government College (Autonomous), Thanjavur, Tamil Nadu, India
barath_bio@yahoo.co.in

Introduction: The present work was carried out to investigate the medicinally active compounds present in the methanolic extract of *Turbinaria conoides* by using the analysis of TLC, UV–vis, and FT-IR. In the present investigation, chromatographic techniques such as thin layer chromatography (TLC) analysis was used to separate and isolate flavonoid compound from the crude extract of *Turbinaria conoides.*

Methods: The solvent system of TLC was n-butanol, acetic acid and water in the ratio of 4:1:5 was used, and its R_f value was detected.

Results: For UV–vis Spectrophotometric analysis, the extract of *Turbinaria conoides* was scanned in the wave length ranging from 190–800 nm by using Perkin Elmer Spectrophotometer and the characteristic peaks and their absorption values were detected. For FT-IR analysis, the extract of *Turbinaria conoides* was focused in the transmittance ranging between 400 and 4000 cm^{-1} on a Perkin Elmer Spectrophotometer system, and the characteristic peak values and their functional groups were detected. From TLC analysis result, a spot was identified with Rfvalue was 0.66. This R_f value was compared with literature data showed that the presence of flavonoid compound as Quercetin-3-galactoside. The UV–vis profile showed the peaks at 200, 224, 232 and 669 nm with the absorption values 3.15, 4.25, 3.65 and 0.25 respectively. The result of UV–vis spectroscopic analysis confirms the presence of phenols and Flavonoids in the *Turbinaria conoides* extract. The results of the present FT-IR study confirms the presence of phenol, alkane, alkene, alcohol, ketone, carboxylic acid, aromatic, nitro, benzene and bromo alkane based compounds.

Conclusions: The results of the present study were revealed that the presence of phenols, flavonoids and functional groups of the *Turbinaria conoides* which indicates the medicinal importance of this Seaweed.

PCP-03

In-vitro Antioxidant, Antimicrobial and Phytochemical Analysis of *Cleistanthus collinus*, *Polygonum glabrum* and *Meliaa zedarch*

Jayabarath Jayaraman*, Yuvashree Rangarajan

Department of Biotechnology, Pavendar Bharathidasan College of Engineering & Technology, Mathur, Tiruchirappalli, Tamil Nadu, India

barath_bio@yahoo.co.in

Introductions: Medicinal plants constitute an effective source of both traditional and modern medicines. The development of bacterial resistance to presently available antibiotics has necessitated the need to search for new antibacterial agents.

Methods: Fresh leaves of *Cleistanthus collinus* Roxb., *Polygonum glabrum* Wild. and *Meliaa zedarach* Linn., were collected from the fields located in Jawadhu Hills, Polurtaluk, Thiruvannamalai District, Tamil Nadu. The finely grounded plant material was extracted with chloroform, ethyl acetate and methanol in the ratio of 1:10 in conical flask in shaking condition for overnight repeated thrice and concentrated through distillation. The extracted residues were weighed and re-dissolved in different solvents to yield 10 mg/ml solutions ready for further analysis such as TLC, antioxidant, antimicrobial and phytochemical analysis.

Results: Antibacterial efficacy: The methanol extract of *C. collinus* at a concentration of 50 μg/ml (7 mm), 200 μg/ml (15 mm); *P. glabrum* and *M. azedarch* concentration of 200 μg/ml (11 mm) possessed significant antibacterial activity against *Staphylococcus aureus*.

Antifungal activity: The antifungal activity of the extracts was tested against *C. albicans* and *C. tropicalis*. Only *C. collinus* extract shown antifungal activity (10 mm) at a concentration of 200 μg/ml.

Antioxidant activity: The antioxidant property was studied by DPPH assay. The methanol extract of *C. collinus* showed better Radical Scavenging Activity (RSA) when compared to *P. glabrum* and *M. azedarch*. The RSA values of *C.collinus* was recorded in the range of 35.6%-77.4%, while that for *P. glabrum* and *M. azedarch*, it was found to be in the range of 28.6%–62.6% and 31.4%–66.6%, respectively

Qualitative Phytochemical Screening: The phytochemical profile of the methanol extracts of the 3 selected plants reveals the presence of tannins, flavonoids and reducing sugars in all the 3 extracts. In addition, *C. collinus* and *P. glabrum* were found to contain moderate amounts of phenols; *P. glabrum* and *M. azedarch* were found to contain trace amounts of reducing sugars

Total Phenols and Falvonoids: The amounts of total phenols present in the extracts of *C. collinus, P. glabrum* and *M. azedarch* was recorded as, 185.5, 20.5 and 25.0 GAE/g sample. Similarly, the amount of total flavonoids in the *C. collinus, P. glabrum* and *M. azedarch* extracts were found to be 650.8, 540.0 and 200.0 QE/g sample.

Thin Layer Chromatography: The TLC profile of the plant extracts revealed the presence of 11, 5 and 9 distinct bioactive compounds in *C. collinus, P. glabrum* and *M. azedarch*, respectively. The Rf values of the bioactive principle of *C. collinus* varied from 0.11–0.91, while that of *P. glabrum* and *M. azedarch* varied in the range of 0.31–0.9 and 0.08–0.8 respectively.

Conclusions: Thus the data obtained from the study suggests that the selected medicinal plants, *C. collinus, P. glabrum* and *M. azedarch* proved to be potent inhibitors of bacterial pathogens. However, further mechanistic studies are required to prove the exact mechanism behind the inhibition. Thus these plants could be considered as a significant source of natural antimicrobial agents.

PCP-04

Development of Monoclonal Antibody-based Flow Through Assay for Rapid Detection of Oxytetracycline-residues in Edible Fish Tissues

Moumita Mondal*, Shankar Kalkuli Mariappa Hegde, Abhiman Purandara Ballyaya

Department of Aquaculture, College of Fisheries, Mangalore, Karnataka, India

moumitamondal1988@gmail.com

Introduction: Oxytetracycline (OTC), tetracycline drug which is very commonly used because of its broad spectrum activity against bacteria, mycoplasma, spirochetes, chlamydiae and rekettsiae. The extensive usage of antibiotics in food producing animals leads to unwanted residues in food products and development of antibiotic-resistance which have been reported from different countries. Specific detection of antibiotic residues in food analysis is of utmost importance to ensure consumer's safety. Recent advances in immunoassays grabbed the attention as rapid diagnostic tools because of their simplicity and low cost in comparison to complicated, time-taking, lab-based equipped techniques.

Methods: In present study we developed a flow through assay (FTA) wherein monoclonal antibody was employed against the target residue 4-epioxytetracycline (main OTC-metabolite in fish). Artificial antigens were synthesized by succinic anhydride coupling method, confirmed by SDS-PAGE and UV–vis spectra and quantified by A-280. OTC-BSA was used in immunizing (IP) Balb/C mice and OTC-OVA as coating antigen. Monoclonal antibody was produced by hybridoma technology. Isotyping was done by Isotyping kit (Sigma).

Results: The molar ratio of hapten to carrier protein was 12:1. The protein concentration of artificial antigens were 1.8 mg/ml (BSA-OTC) and 1.5 mg/ml (OVA-OTC). Among the reactive hybriboma producing clones, most reactive and specific clone 2A11 (IgG

class) was selected, purified and cloned which was later used in developing Flow through assay. Cross-reactivity studies with other tetracyclines showed negligible reactivity and no reaction observed with other class of antibiotics. Experimentally OTC-feed fish tissue samples were analyzed with FTA which could specifically detect OTC residues within 8–10 min whereas 60–90 min in case of immunodot.

Conclusions: Finally our developed monoclonal-antibody based FTA would serve the purpose of on-site rapid diagnosis of oxytetracycline residues which can be performed by non-skilled person in non-laboratory condition.

PCP-05

Evaluation of Therapeutic Potential of Polymeric Nanoparticle-Encapsulated Curcumin for Management of Subclinical Mastitis

Palanisamy Sankar*[1], Subramaniyam Suresh[2], Avinash Gopal Telang[2]

[1]Department of Veterinary Pharmacology and Toxicology, Veterinary College and Research Institute, Orathanadu, Thanjavur, India

[2]Division of Pharmacology and Toxicology, Indian Veterinary Research Institute, Izatnagar, Bareilly, India

drpsankarster@gmail.com

Introduction: The therapeutic potential of polymeric nanoparticle-encapsulated curcumin was evaluated in mouse model of mastitis. Mastitis caused by *Staphylococcus aureus* is usually subclinical and chronic in nature.

Methods: Poly-(D,L-lactide)-co-glycolide (PLGA)-encapsulated curcumin nanoparticles (CUR-NP) prepared through solid-in-oil-in-water emulsion technique were administered by oral gavage as pre-treatment from day 2 to day 7 of parturition. Both curcumin and CUR-NP were administered at 100 mg/kg bw. Mastitis was induced by infecting the mice with Staphylococcus aureus through intramammary inoculation on the 9th day of parturition. Accordingly, the curcumin or CUR-NP-pretreated mice were given intramammary inoculation. Body temperature was recorded at different time intervals after inoculation. Mammary tissues from animals were collected at 24, 48 and 72 h post-infection.

Results: There was swelling in the mammary gland of the mastitis control mice. In these animals, there were significant rise in body temperature and increase in neutrophil and decrease in lymphocyte counts. The swelling subsided in both the curcumin- or CUR-NP-treated mice after 12–24 h, while body temperature and the leukocyte counts were restored after 48-72 h in these animals. The number of colony forming unit (CFU) counted in the L_4 abdominal mammary gland homogenate of the mastitis control group was significantly reduced with both curcumin and CUR-NP. Differential bacterial count was done in the same homogenate. Curcumin significantly decreased the total and extracellular counts, whereas CUR-NP also decreased intracellular count. Comparison of the effects showed that CUR-NP was significantly more effective in reducing the body temperature, CFU and intracellular bacterial count than curcumin.

Conclusions: These results suggest that CUR-NP may possess better potential in alleviating murine mastitis than curcumin.

PCP-06

Canagliflozin – Novel SGLT 2 Inhibitor for Diabetes Mellitus – A Review

Sarath Kumar Sasidharan Nair Jayakumari*[1], Deepthi Murukesan Vasantha[2], Shaiju S. Dharan[1], Mathan Swamy[1], Merlin Nelson Joseph[3], Anusree Sathikumari[3]

[1]Department of Pharmaceutics, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Neyyattinkara P.O, Thiruvananthapuram, Kerala, India

[2]Department of Pharmaceutical Chemistry, Sree Krishna College of Pharmacy and Research Centre, Parassala P.O, Thiruvananthapuram, Kerala, India

[3]Department of Pharmacology, Ezhuthachan College of Pharmaceutical Sciences, Marayamuttom, Neyyattinkara P.O, Thiruvananthapuram, Kerala, India

sarathkumarsj123@gmail.com

Introduction: Glucose is the main source of energy for the entire living beings. Glucose is absorbed from various sources and are metabolized in several ways for the need of organisms. Kidney play an important role in glucose metabolism which are responsible for the reabsorption of glucose. They contribute to glucose balance by producing glucose through gluconeogenesis, utilizing glucose in renal medulla and nearly 100% re-absorption of the filtered glucose. Diabetes mellitus (DM) is a metabolic disorder of multiple etiology, characterized by chronic hyperglycemia with disturbance in the carbohydrate, fat and protein metabolism resulting from altered insulin secretion and/or insulin resistance. These may be associated with glycosuria, negative nitrogen balance or ketonaemia. It is a progressive disease resulting in complications like nephropathy, retinopathy, neuropathy, and vascular complications.

Methods: Number of different drugs are available for the treatment of diabetes mellitus. They are sulphonylurea, biguanides, meglitinides, alpha glycosidase inhibitor, glitazones etc. Mechanism of action of available drugs includes increasing insulin secretion, increasing insulin sensitivity, controlling hepatic glucose release or inhibiting intestinal glucose absorption. These drugs has many adverse effects mainly hypoglycaemia. The other side effects include weight loss, lactic acidosis etc. This review focusses on the novel antidiabetic drug canagliflozin. The datas are collected from journals and reports from various research laboratories.

Results: Sodium-dependant glucose co-transporters (SGLT1 and SGLT2), also known as co-transporters or symporters, are integral membrane proteins that mediate the transport of glucose with much lower affinity and galactose across the plasma membrane by an active transport mechanism. This transport process cotransport glucose molecule and sodium ions. The energetically favored movement of a sodium ion across the plasma membrane into the cell is driven by a concentration gradient and a membrane potential and is coupled with transport of sodium ions in to the cell across the apical cell membrane which is pumped by a sodium/potassium ATPase across the basolateral membrane via glucose transport facilitators designated GLUT-Proteins. The SGLT1 is a high affinity, low-capacity sodium–glucose symporter with sodium-to glucose coupling ratio of 2:1. The transporter is expressed mainly in intestine, heart, and kidneys. Canagliflozin is a new Sodium–Glucose co-Transporter-2 (SGLT-2) blocker, which inhibits the re-absorption of glucose from the kidneys, thereby causing loss of glucose in the urine and reduction of blood sugar levels and weight loss. An additional justification for using this drug is the belief that the kidney of diabetics reabsorbs more glucose, as compared to normal individuals, which contributes to a further rise in blood sugar levels.

Conclusions: Canagliflozin plays a major role in renal glucose reabsorption and its tissue distribution is limited to the kidney, thus reducing side effects. Effect of canagliflozin on blood glucose control via an increase in urinary glucose excretion results in negative energy balance with body weight control and preservation of insulin secretion. The adverse effects of canagliflozin include hypotension, hyperkalaemia etc. The important advantage

of canagliflozin is that it cannot cause hypoglcaemia which is one of the major disadvantage of other available antidiabetic drugs.

PCP-07

Phytochemical and Microscopical Studies of Rudraksh (*Elaeocarpus angustifolius* Blume) Fruit

Sunil Jawla*[1], Durg Vijay Rai[2]
[1]Adarsh Vijendra Institute of Pharmaceutical Sciences, Shobhit University, Gangoh, Saharanpur, Uttar Pradesh, India
[2]Center for Biological Engineering, Shobhit University, Gangoh, Saharanpur, Uttar Pradesh, India
suniljawla777@gmail.com

Introduction: *Elaeocarpus angustifolius* Blume fruit is used traditionally for its medicinal properties by local people in Indian sub-continent for cure of various ailments and various pharmacological activities like anti-convulasnt, antihypertension, anti-inflammatory, and antimicrobial activity of rudraksh as reported by various researchers.

Methods: In present work phytochemical screening, proximate composition, elemental analysis and microscopical studies of *Elaeocarpus angustifolius* Blume fruit were carried out. Fruit pulp was dried in shade and powdered and extracted with petroleum ether, ethanol, ethanol:water (1:1). Phytochemical screening of fruit pulp extracts were carried out for presence of glycosides, flavonoids, saponins, alkaloids, steroids, tannins and phenolic compounds. The pulp proximate composition analysis carried out for estimation of moisture, protein, fat and ash. The elemental analysis of fruit pulp was carried out for estimation of carbon, hydrogen, nitrogen and oxygen. Anatomical characterization of the dried powder of *Elaeocarpus angustifolius* bead and pulp revealed important elements for their recognition and taxonomy, including the pattern of epidermal cells, crystals, stone cells, cork cells, vessels (xylem and phloem) and sclerenchyma, parenchyma and other characteristics. The anatomical study revealed key elements for the recognition of *Elaeocarpus angustifolius* fruit when reduced to fragments.

Results: Phytochemical screening of *Elaeocarpus angustifolius* Blume fruit pulp extracts confirmed the presence of glycosides, flavonoids, saponins, alkaloids, steroids, tannins and phenolic compounds. The pulp proximate composition analysis indicated percentual average value for moisture, protein, fat and ash as 4.2, 4.28, 1.9 and 1.55, respectively. The elemental analysis of fruit pulp showed carbon, hydrogen, nitrogen and oxygen as 44.78%, 4.54%, 0.33% and 35.66% respectively. The C/N ratio was found to be 134.47, which support the proximate analysis indicating the protein content 4.28%. The analysis of pulp powder demonstrated the considerable nutritional value and low caloric content. In view of the high nutritional value of pulp power, *Elaeocarpus angustifolius* fruitcan be applied in diets in the form of dehydrated flour, easily incorporated into food. Based on the results of the present study, however, it was found that introducing rudraksh pulp into the human diet could have significant nutritive impact. Anatomical characterization of the dried powder of *Elaeocarpus angustifolius* Blume bead and pulp reflected important elements for their recognition and taxonomy, including the pattern of epidermal cells, crystals, stone cells, cork cells, xylem and phloem vessels and sclerenchyma, parenchyma and other characteristics. The anatomical study reveals key elements for the recognition of *Elaeocarpus angustifolius* fruit when reduced to fragments.

Conclusions: These studies may be further useful in identification of fruit, and elemental and proximate analysis indicated the nutritive importance of fruit. The phytochemical screening strengthens the traditional use of fruit for its medicinal values.

PCP-08

Screening of Novel Acetylcholinesterase and Amyloid β Protein Inhibitors from Ethanol Extract of *Aristolochia bracteolata* using GC–MS Analysis and its Molecular Docking Studies

Dhivya Sundaram*[1], Selvamani Palanasamy[1], Sathish Kumar Marimuthu[1], Latha Subbiah[1]
[1]Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University BIT Campus, Tiruchirappalli, Tamil Nadu
dhivyapsundaram@gmail.com

Introduction: Alzheimer's disease (AD) is an incapacitating neurodegenerative disease that progressively declines the memory and cognition. Currently approved acetylcholinesterase inhibitors (AChEIs), fail to provide a permanent cure to the disease which also presents several side effects. Hence at present the search is mainly focused on new AChEIs and new enzymatic targets for Alzheimer's disease like Amyloid β- and γ-secretases, sirtuins, caspase proteins and glycogen synthase kinase-3 (GSK-3).

Methods: Therefore, the aim of present study is to identify the novel AChE and Amyloid β protein inhibitors from the bioactive compounds present in ethanol extract of *Aristolochia bracteolata using* GC–MS analysis and its molecular docking studies. Docking studies help to understand the binding interactions of the protein with the ligands. Structure of acetylcholinesterase and Aβ precursor was selected from PDB and the phytoconstituents were selected as ligands. Docking studies were performed using Autodock 4.0.

Results: Results, GC–MS analysis shown that, ethanol extract of *Aristolochia bracteolata* contain 32 bioactive compounds. Molecular docking studies of theses bioactive compounds revealed that, out of 32 bioactive compounds, Neoabietic acid, methyl ester, phenylacetate, tetradecanoic acid and hexadecanoic acid, ethyl ester shows the better binding energies compared with Donepezil (FDA approved drug). Based on the result it can be concluded that, these bioactive compounds may act as novel inhibitors for acetylolinesterase and amyloid β protein.

Conclusions: These results suggest that *Aristolochia bracteolata* may provide a substantial source of secondary metabolites, which may be beneficial in the treatment of Alzheimer's disease.

PCP-09

***In-vitro* α-Amylase and β-Glucosidase Inhibitory Activities of Ethanolic Extract of *Lactuca runcinata* DC**

Ramprasad Ramu*, Madhusudhan Sampathkumar,
Department of Pharmacy, Annamalai University, Annamalai Nagar, Chidambaram, Tamil Nadu, India
ramphd@outlook.com

Introduction: The present study was intended to investigate the *in-vitro* α-amylase and β- glucosidase inhibitory activities of ethanolic extract of the whole plant of *Lactuca runcinata* (DC.). Postprandial hyperglycemia is a prime characteristic of diabetes mellitus and has been a focus in the therapy for diabetes. Pancreatic α-amylase and β-glucosidase inhibitors offer an effective technique to lower levels of postprandial hyperglycemia using control of starch breakdown. Both the therapeutic methodologies which include diminishing hyperglycemia goes for at inhibiting the enzyme α-amylase and β-glucosidase.

Methods: In this study range, herbal remedies are considered convenient for the management of Type 2 diabetes with postprandial hyperglycemia because their traditional adequacy and acceptability, low expenses, lesser side effects. The ethanolic extract got was subjected to *in-vitro* alpha amylase and alpha-glycosidase inhibitory assay utilizing starch azure as a substrate and porcine pancreatic amylase as the enzyme. The enzyme

solutions were premixed with extract at distinctive concentrations (20, 40, 60, 80 and 100 mg/ml). Substrate solutions and colorimetric reagents were added to the reaction.

Results: The glucose measurement was done by spectrophotometric method. Acarbose kept as the positive control. The extract (20–100 mg/ml) totally inhibit α-amylase and α-glucosidase activities. The extract produced a higher reduction of α-glucosidase activity than α-amylase. Inhibition at various concentrations were significantly different ($p < 0.05$).

Conclusions: The results demonstrated a significant (more than 80%) reduction in α-amylase and additionally 90% reduction in β-glucosidase activity. This finding gives the utilization of ethanolic extract of the whole plant of *Lactuca runcinata* effective in inhibiting α-amylase and β-glucosidase thereby proving to be potentially hostile to hyperglycemic agents.

PCP-10

Impact of Albumin on Translational Research – A Journey from Laboratory to Market

Bharat Bhushan[1], Gopinath Packirisamy*[2]
[1]Centre for Nanotechnology, Indian Institute of Technology Roorkee, Uttarakhand, India
[2]Department of Biotechnology, Indian Institute of Technology Roorkee, Roorkee, Uttarakhand, India
nanobiogopi@gmail.com

Introduction: Nano-enabled technology emerged as a potential nano-platform in the field of translational nanomedicine. Among the various nanomaterials developed so far, albumin-based nanoparticles hold great promise for health issues and biological research. To date, a variety of albumin-based nanoformulations have been developed and investigated in surfeit of cell line and animal models.

Methods: In the present study, we aim to focuses on the albumin based nanoparticles, which have successfully completed their journey from lab bench to marketed products.

Results: The versatile physiochemical properties of albumin aid in its interaction with a variety of therapeutic, targeting and diagnostic moieties. These nanoparticles overcome the toxicity issues associated with solvent-based formulations used for the intravenous administration of hydrophobic agents, by exploiting the natural cellular uptake pathways. In this regard, the breakthrough comes with the development of food and drug administration (FDA) approved albumin-paclitaxel nanoparticles (Abraxane®) for treating metastatic breast cancer, which had initiated intensive pursuit of exploiting albumin for cancer diagnosis and personalized medicine.

Conclusions: This review gives a brief overview about the albumin-based nanoparticles that are under preclinical and clinical trials and also focuses on the recent most promising advancement in the field of albumin-based approaches for various biomedical applications and their potential use in translational research.

PCP-11

Phytochemical Constituents and *In-vitro* Antidiabetic Activity on Rhizome Extracts of *Costus speciosus* (*Koen*)

Jebaseelan Sargunam Azariah*[1], Solairaj[2], Ramasubramanian[3], Venkateshan[4]
[1]Department of Pharmaceutical Chemistry, Ultra College of Pharmacy, Madurai, Tamil Nadu, India
[2]Sankaralingam Bhuvaneshwari College of Pharmacy, Sivakasi, Tamil Nadu, India
[3]Department of Pharmaceutics, Sankaralingam Bhuvaneshwari College of Pharmacy, Sivakasi, Tamil Nadu, India
[4]Department of Pharmaceutical Chemistry, Sankaralingam Bhuvaneshwari College of Pharmacy, Sivakasi, Tamil Nadu, India
jebaseelanmpharm2000@rediffmail.com

Introduction: Medicinal Plants have been of great importance to the health care needs of individuals and their communities. Diabetes mellitus (DM) is a common epidemic disease affecting the people of the developed and developing countries. Globally diabetes affects 246 million people, which is about 6% of the total adult population. It is the fourth leading cause of death and every 10 s, a person dies from a diabetes-related cause in the world. World Health Organization (WHO) is also supporting the research on herbal medicine for type 2 diabetes mellitus. Various hypoglycemic agents from medicinal plants have been found to be effective and safe.

Methods: In the present study an attempt was made to investigate the phytochemical constituents and *in-vitro* antidiabetic activity on rhizome extracts of costus speciosus.

Results: The active constituents of the rhizome extracts were found, and the extracts were subjected to *in-vitro* evaluation of alpha-amylase and alpha-glucosidase enzyme inhibition. The methanolic extract of the rhizome of costus speciosus revealed a dose-dependent increase in percentage inhibitory activity against alpha-amylase enzyme and alpha-glucosidase enzyme. The antidiabetic action of *Costus speciosus* (*Koen*) can also be attributed to the intestinal alpha-amylase and alpha-glucosidase inhibitory activity.

Conclusions: Further studies are required to elucidate whether *Costus speciosus* (*Koen*) have antidiabetic potential in *in-vivo* for validating the traditional claim of the plant.

PTP-01

Core-Shell Formation Of Iron Oxide And Silver Nanoparticles For Gp41 Receptor Inhibition In Retrovirus

Aishwarya Chakavalapil[1], Narendhar Chandrasekar*[1], Atmajah Bala[1], Dhivya Parameshwari Arjunan[1], Balaji Ramachandran[1], Rajesh Thanga Pichyappa[2]
[1]Department of Nanoscience and Technology, Sri Ramakrishna Engineering College, Coimbatore, Tamil Nadu, India
[2]Department of Biotechnology Anna University Tiruchirappalli, Tamil Nadu, India
narendharc@gmail.com

Introduction: Iron oxide nanoparticles are iron oxide particles with diameters between about 1 and 100 nanometers. The two primary forms are magnetite (Fe_3O_4) and its oxidized form maghemite (γ-Fe_2O_3). They have attracted extensive interest due to their superparamagnetic properties and their potential applications in many fields. These applications require a coating of the nanoparticles by agents such as long-chain fatty acids, alkyl-substituted amines, and diols. Synthesis of iron oxide is done by coprecipitation technique where mixtures of ferrous and ferric hydroxides are taken in aqueous media, yielding spherical magnetite particles homogeneous in size. Silver nanoparticles (colloidal silver) have unique optical, electronic, and antibacterial properties, and are widely used in areas such as biosensing, photonics, electronics, and antimicrobial applications.

Methods: Reverse micelles are nanometer-sized (1-10nm) water droplets dispersed in organic media obtained by the action of surfactants. Surfactant molecules organize with the polar part to the inner side able to solubilize water and the non-polar portion in contact with the organic solvent. Proteins can be solubilized in the water pool of reverse micelles. The unique characteristics of reverse micelles make them very useful for biotechnological applications. Synthesis of silver nanoparticles was done by the wet chemical method by reduction of a silver salt such as silver nitrate with a reducing agent like sodium borohydride in the presence of

a colloidal stabilizer. After the addition of reducing agent as NaBH4, the iron precursor solution is added to the mixture followed by another dose of reducing agent. This enables the silver particles to be seeded as the precursor for iron crystals to be deposited over them.

Results: The synthesized particles are characterized using UV-Vis spectroscopy, DLS, FT-IR, and XRD. The particles were observed for core shell formation by UV-Visible spectrum as the silver core will show the Surface Plasmon peak at 400-500 nm range. Once the shell if formed the peak will be hidden due to the formation of Iron/Oxide shell around the particles. The size of the particles are optimized to be around 40 – 50 nm for possibly binding to the GP 41 proteins.

Conclusions: The particular size of the GP41 protein in the retroviral protein makes up serves as an opportunity for the particles in a similar size range to be physically adsorbed to it. Thus rendering the virus unable to attach to the human host via the GP41 receptor. The aim of the work is to optimize the size of the core-shell particles that will also be magnetic to retrieve the viral particles by an external magnetic field.

PTP-02

Formulation and Evaluation of Indomethacin Magnetic Nanoemulsion

Ajith Kumar Anbu, Prabu Chakkarapani, Latha Subbiah*, Selvamani Palanisamy

Centre for Excellence in Nanobio Transaltaional Research & Department of Pharmaceutical Technology, Anna University, BIT Campus, Tiruchirappalli, Tamil Nadu, India

lathasuba2010@gmail.com

Introduction: Indomethacin is a non-steroidal anti-inflammatory drug has low aqueous solubility. The present objective is to formulate a liquid isotropic magnetic nanodispersion composed of indomethacin, magnetite, a lipophilic surfactant, olive oil, water and hydrophilic surfactant into magnetic nanoemulsion by ultrasonification. Magnetic nanoemulsion can be defined as an emulsion with mean droplet diameter ranging from 50 to 1000 nm used as targeted drug delivery carrier in pharmaceutical and biomedical aids; as vehicles for cosmetics etc.

Methods: Various formulation of oil-in-water magnetic nanoemulsion was prepared with a different recipe by varying the constituent and formulating them at a constant temperature with the help of high-frequency shear device ultrasonicator. The prepared indomethacin magnetic nano emulsion was subjected to various pharmaceutical quality parametes evaluation and stability studies under 25 °C and 65% RH.

Results: Dye test indicates that water is in continous phase and the emulsion as the O/W emulsion,FTIR studies indictaed that there is no intraction between the excepients.viscosity and the density of the emulsion were −0.847 cP and 0.944 kg/m^2. Size of the particles was −261 nm. TEM picture revals that the prepared emulsion contains oil globules were spherical in nature.

Conclusions: We conclude that prepared magnetic nanoemulsion shows the good stability and useful for the sustained delivery of the indomethacin to the target size using the external magnetic field.

PTP-03

Development and Characterization of Nanosponge Containing Antihyperlipidmic Drug

Haribhaskar Ramachandran*, Shaik Rafi Kamal, Jawahar

J.S.S. College of Pharmacy, (Constitutent College of JSS University, Mysore), Ootacamund, Tamil Nadu, India

haribhaskart@gmail.com

Introduction: Nanosponges are a new class of materials and made of microscopic particles with few nanometer wide cavities, in which a large variety of substances can be encapsulated. These particles are capable of carrying both lipophillic and hydrophillic substances and which in turn may help in improving the solubility of poorly water soluble molecules. Nanosponges are soluble both in water and organic solvents, porous and stable at high temperatures upto 300 °C. Its 3D structure containing cavities of nanomeric size with tunable polarity and high solubility they are able to capture and selectively release a wide varity of substances in a sustained manner. Hyperlipidemia is a common disorder in developed countries and is the major cause of coronary heart disease. It results from abnormalities in lipid metabolism or plasma lipid transport or a disorder in the synthesis and degradation of plasma lipoproteins. Hyperlipidemia means abnormally high levels of fats in the blood. These fats include cholesterol and triglycerides. These are important for our bodies to function but when they are high, they can cause heart disease and stroke.

Methods: Upon literature review, drug, polymer and excipients has been selected and preformulation studies were conducted. For the developed formulation, melting point, solubility and compatability studies through FT-IR spectroscopy were performed. Based on the results, formulation and optimization of polymeric Nanosponges was performed and were characterized for its particle size, zeta potential, morphology (SEM), Entrapment efficiency, *in-vitro* drug release studies, *in-vivo* oral bioavailability studies.

Results: Nanosponges were evaluated for zeta potential, entrapment efficiency, particle size and *in-vitro* release studies. In order to elucidate mode and mechanism of drug release the *in-vitro* data was fitted into various kinetic models.

Conclusions: To conclude that emulsion solvent evaporation technique was suitable for producing nanosponges. Lipophilic drugs like simvastatin can be successfully incorporated into the polymers. The formulated Nanosponges and Nanosponge tablets showed a significant increase in oral bioavailability compared to simvastatin marketed formulation. Nanospongs provided sustained release of the drugs, and these systems can be preferred as drug carriers for lipophilic drugs like simvastatin for anti-hyperlipidemia for improved oral bioavailability.

PTP-04

Formulation and Evaluation of Orodispersible Tablets of Galantamine HBr by Direct Compression Method

Jeevitha Moorthy*, Vijay Prakash Pandey

Department of Pharmacy, Annamalai University, Chidambaram, Tamil Nadu, India

jeevipharma@gmail.com

Introduction: The present study aimed to formulate and evaluate orodispersible tablets of Galantamine HBr by Direct compression technique using two different approaches namely; addition of super-disintegration and effervescence. Different combined approaches were proposed and evaluated to optimize tablet characteristics.

Methods: Crospovidone was used as the superdisintegrant. The prepared powder mixtures were subjected to both pre and post compression evaluation parameters including; IR spectroscopy, micromeritics properties, tablet hardness, friability, wetting time, disintegration time and *in-vitro* drug release.

Results: IR studies indicated that there was no interaction between the drug and the excipients used. The results of micromeritics studies revealed that all formulations were of acceptable to good flowability. Tablet hardness and friability indicated good mechanical strength. Wetting and dispersion times decreased by increasing the crospovidone concentration in tablets prepared by

superdisintegration method. The formulation GAL7 which was prepared by effervescence gave promising results for tablet disintegration and wetting times. Further addition of Sodium bi carbonate and Crospovidone instead of lactose in the same formulation increased the drug release rate.

Conclusions: Based on the pre and post compression studies GAL7 was concluded as best formula and it can be routinely used to formulate galantamine orodispersible tablet.

PTP-05

Development and Evaluation of Olanzapine Loaded Chitosan Nanoparticles for Nose to Brain Targeting

Joysa Ruby Joseph Rajarathinam*, Pandey Vijay Prakash
Department of Pharmacy, Annamalai University, Annamalai Nagar, Tamil Nadu, India
joysaruby2010@gmail.com

Introduction: Olanzapine is an FDA approved atypical antipsychotic drug for treatment of schizophrenia and bipolar disorders which selectively binds to central dopamine D_2 and serotonin (5-HT_2c) receptors. It shows low bioavailability due to extensive first pass metabolism and results in numerous side effects due to non targeted delivery.

Methods: The olanzapine loaded chitosan nanoparticles were prepared by ionic gelation of chitosan with tripolyphosphate anions (TPP). The formulated olanzapine chitosan nanoparticle were studied for its morphology by SEM, particle size, polydispersity index, zeta potential, *in-vitro* drug release, *in-vitro* toxicity by using human nasal epithelial cell line RPMI 2650 using MTT assay and histopathological study on excised goat nasal mucosa.

Results: Mean particle size, polydispersity index and zeta potential was found to be 183.1 ± 8.42 nm, 0.122 ± 0.08, 42.1 ± 2.4 mV respectively. The entrapment efficiency and drug loading was found to be $72.42 \pm 3.65\%$ and 26 ± 2.12. *In-vitro* drug release studies showed a biphasic release pattern with initial burst release followed by sustained release of olanzapine from nanoparticles. Olanzapine nanoparticles exhibit significant cytotoxicity in nasal epithelial cells in a dose dependent manner with a very low IC_{50} value compared to the free olanzapine. Histopathological study of goat nasal mucosa showed no significant adverse effect of olanzapine loaded nanoparticles.

Conclusions: Olanzapine loaded chitosan nanoparticles is a potential new delivery system for treatment of depressant when transported via olfactory nasal pathway to the brain.

PTP-06

Amphiphilic Alginate Micellar Gel for Controlled Percutaneous Delivery of Fluconazole

Leena Kumari[1], Bibek Laha[1], Sabyasachi Maiti*[1], Mintu Pal[2]
[1]Department of Pharmaceutics, Gupta College of Technological Sciences, Asansol, West Bengal, India
[2]Biotechnology Division, CSIR North East Institute of Science and Technology, Jorhat, Assam, India
sabya245@rediffmail.com

Introduction: Percutaneous application of a drug containing formulation directly to the skin can be used to treat fungal and yeast infections on the surface of the skin or within the skin. Percutaneous application of drugs appears to be an attractive route of administration to reduce systemic side effects, and increase the therapeutic efficacy, and the patients' compliance due to its non-invasive nature. Amphiphilic copolymer micelles generally exhibit a much lower critical association concentration (CAC) than that of low molecular weight surfactants. Therefore, they are more stable than surfactant micelles and can prevent premature release of entrapped drug molecules. Polysaccharides could be a promising candidate as the shell-forming material for the fabrication of amphiphilic copolymer micelles owing to their biocompatible, biodegradable and non-toxic properties. The chemical structure of these bio-polysaccharides are modified and decorated in such a fashion that they become viable candidates for the formation of hydrophilic shell of the micelles. Currently, polymeric micelles loaded formulations are widely employed as 'smart' carriers in a range of drug delivery areas, including percutaneous delivery. Therefore, the objective of this study is to design fluconazole-loaded biopolymer micelles and evaluate their potential in controlling the release of medication over the skin surface when dispersed in Carbopol gel base.

Methods: The hydrophobic cetyl group was grafted onto sodium alginate, a water-soluble non-toxic bio-polysaccharide via etherification reaction. The synthesis of copolymer was confirmed by CHN analysis. The CAC value of the copolymer was determined by fluorescence spectroscopy. The size and zeta potential of nanoscale particles were also measured by dynamic light scattering techniques. Fluconazole, an anti-fungal drug, was entrapped into the copolymer micelles by solvent evaporation technique. The drug-loaded micelles were then dispersed in Carbopol 934P gel (pH 7.0), preserved with parabens. The *in-vitro* permeation study was conducted using Swiss albino mice skin using Franz diffusion cell.

Results: The hydrophobically modified alginate self-assembles in aqueous solution to form polymeric micelles above the CAC value. The CAC value was found to be 1.0 mg/ml. TEM images revealed spherical morphology of the nanomicelles. The drug-loaded micelles were in the size range of 282 to 445 nm and the zeta potential values were negative. This indicated that the anionic sodium alginate constituted the shell part of micellar structures. The zeta potential values were found to retain at the range of -22.4 to -35.0 mV indicating that copolymer micelles are stable in aqueous solution. The solubility of fluconazole was enhanced by 25.86 times in copolymer solution compared to that obtained in water. There was no sign of improvement in the solubilization capacity with variation in polymer–drug weight ratio. Only 44.82% drug permeated through the animal skin in 8 h at pH-7.4 phosphate buffer solution from the gel formulation containing pure fluconazole. On contrary, the drug permeation became slower appreciably and reached to only about 15% from the formulation containing micellar fluconazole in same duration. This may be explained by the fact that the drug entrapped into micellar core slowly released into aqueous gel base and consequently prolonged the duration of drug permeation. It was found that the *in-vitro* drug permeation was best explained by zero order equation, as the plots showed the highest linearity, followed by first order and Higuchi model. The drug release was also found to be very close to zero-order kinetics, suggesting that the drug release was nearly independent of concentration.

Conclusions: The amphiphilic alginate copolymer can be successfully synthesized by etherification reaction. The copolymer can form micelles when dispersed in water. This system shows potential for solubilization of poorly soluble drugs and consequent percutaneous delivery in a controlled manner.

PTP-07

Phospholipid Complex Technique for Superior Bioavailability of Phytoconstituents

Sri Nataraj Kalakonda*[1], Gnananath Kattamanchi[1], Ganga Rao Battu[2]
[1]Department of Pharmaceutical analysis (Affiliated to Andhra University), Shri Vishnu College of Pharmacy, Vishnupur, Bhimavaram, West Godavari, Andhra Pradesh, India

[2]Department of Pharmacognosy and Phytochemistry, University College of Pharmaceutical Sciences, Andhra University, Vishakhapatnam, Andhra Pradesh, India
drnatraj@svcp.edu.in

Introduction: Herbal medicines gained popularity worldwide by their efficiency in treatment of various chronic diseases. However, they face a major hurdle with bioavailability. These are due to their poor lipid solubility or huge molecular size, resulting in poor absorption and hence poor bioavailability. With advent of novel drug delivery system phytosomes, is like a key to unlock the major hurdles associated with phytoconstituents.

Methods: The main objective of this review is to summarize prerequisite for phytosomes preparation like the selection of type of phytoconstituents, solvents, phospholipid and its additional uses and various methods involved in phytosomes preparation and its characterization forms and the phyto-phospholipid formulations.

Results: A detailed review on the subject has been carried out.

Conclusions: In addition, key findings of recent research work conducted on phytosomes which can give the new directions and advancements to herbal dosage forms and the phyto-phospholipid formulations.

PTP-08

Development of Carboxymethylated Guar Gum Based Hydrogel For Controlled Drug Delivery of *Rosiglitazone maleate*

Nitai Chand Chaulya*, Sudeshna Halder
Department of Pharmaceutical Analysis, Gupta College of Technological Sciences, Ashram More, G.T. Road, Asansol, West Bengal, India
sudeshna.halder90@gmail.com

Introduction: In the case of multi-dosing therapy, the constant drug concentration in blood plasma can be maintained for a longer period of increasing the initial dose that in turn may cross the therapeutic level and reach a toxic level. Therefore, controlled drug delivery systems have been introduced to overcome the drawback of fluctuating drug levels associated with conventional dosage form. Smart hydrogel or stimuli-sensitive hydrogels are bioadhesives and controlled release dosage form due to the presence of temperature and pH sensitive, an intelligent polymer that swells in an aqueous medium and acts as controlled drug release carrier by which the drug concentration in the target site is maintained within the therapeutic window. Nowadays, 99% people suffering from type-II diabetes. Guar gum is a good biomaterial for hydrogel preparation, but guar gum has some drawbacks such as uncontrolled rate of hydration, pH dependent solubility and high susceptibility to microbial attack. Chemical modification can overcome such drawbacks and also improve swelling and solubilisation. Different type of substitution occurs in a hydrophilic group like ether, amine-carboxyl, sulphate, hydroxyl group. Chemical modification aimed at developing functional characteristics make guar gum versatile and useful in a variety of application. The modification of guar gum into various water soluble derivatives involves the substitution of the free hydroxyl group along the macromolecule backbone. Carboxymethylation process was selected due to its technical simplicity, low cost of the chemical reaction. Thus, the aim of the present work was to develop a carboxymethylated modified guar gum-based controlled release hydrogel formulation with *Rosiglitazone maleate* using a different type of crosslinker.

Methods: Hydrogels were prepared via solution polymerization technique and characterized by DSC and FT-IR analyses. *In-vitro* dissolution study was performed for measuring the drug release and drug kinetics. *In-vivo* study was conducted in the animal model. After performing the different type of evaluation process, it was found that glyoxal loaded formulation showed better result compared to N,N-methylene bisacrylamide and glutaraldehyde

Results: Performing the different characterization study, it was found that % of swelling for glyoaxl, glutaraldehyde and acrylamide was 42%, 30.30% and 20.10%, respectively at pH7.4 and % of drug release was respectively 54.07%, 48.33%, 41.92% after 240 min. FT-IR study confirmed the absence of chemical reaction between drug and excipients. DSC results represented the amorphous nature of the drug entrapped drug embedded in a polymer matrix. Drug entrapment values were 88.12%, 71.21%, respectively. In the case of *in-vivo* study for glyoxal formulation, T_{max} (1 h) and plasma concentration were found 0.47868 μg/ml. In this study, rosiglitazone hydrogel formulation was successfully developed and optimized.

Conclusions: The results with glyoxal crosslinked guar gum hydrogel was promising for the controlled delivery of drugs. Further studies required for effective formulations and large-scale standardization.

PTP-09

Preparation and Evaluation of Mefenamic Acid Magnetic Nanoparticles for Rheumatoid Arthritis

Prasanth Janakiraman[1], Latha Subbiah*[1], Selvamani Palanisamy[1]
[1]Department of Pharmaceutical Technology, Anna University, BIT Campus, Tiruchirappalli, India
lathasuba2010@gmail.com

Introduction: Using nanoparticles for treatment of Rheumatoid arthritis increases the bioavailability of the drug in the particular region of disease. Passive targeting by nanoparticles encounters multiple obstacles on the way to their target due to precise delivery of the drug. Therefore, Targeting by guiding nanoparticles to the specific tissues reduces the toxicity of the drug to normal tissues. Magnetic materials like magnetite and maghemite are incorporated into nanoparticles, and drug targeting can be achieved by using an external magnetic field. These issues in the novel drug delivery through magnetic nanoparticles are fabricated in this proposed paper for an anti-inflammatory drug for the therapy of rheumatoid arthritis by using Mefanimic acid magnetic nanoparticles as templates produced by the cross linking method.

Methods: The magnetic nanoparticles were produced using oxidation precipitation method. The prepared particles were evaluated for its size, physicochemical, pharmaceutical properties including release profile of mefanamic acid.

Results: The prepared particles were at the average size of 196 nm, and poly dispersity index 0.0906. Spherical in shape with rough surface with high encapsulation efficiency of 88.94% and drug loading 31.2% with sustained delivery of mefanimic acid.

Conclusions: The mefanamic acid magnetic nanoparticles have been successfully developed for sustained release magnetic targeting at rheumatoid arthritic sites.

PTP-10

A Simple and Non-Invasive Approach For Sitagliptin Phosphate In Transdermal Drug Delivery Systems

Raghuraman Vinayagam*, Vijay Prakash Pandey
Department of Pharmacy, Annamalai University, Annamalai Nagar, Tamil Nadu, India.
indramvk7@gmail.com

Introduction: For Thousands of years, human civilizations have applied substance to the skin as cosmetic and medicinal agents. However, it was not until the twentieth century that the skin came

to be used as a drug delivery route. In fact, Marian Webster dates the word "transdermal" to 1944 highlighting that it is a relatively recent concept in medical and pharmaceutical practice. TDDS delivers drugs through the skin as an alternative for more traditional route like orals, intravascular, subcutaneous and transmucosal. A Transdermal Drug Delivery Systems (TDDS) or transdermal patch is defined as flexible, multilaminated, Pharmaceutical preparation of varying size containing one or more drug substance to be applied to the intact skin for systemic circulation to maintain the plasma level and it is illustrated.

Methods: The TDDS composed of different ratios of PVA and PVP containing sitagliptin phosphate (1 mg/cm^2) were prepared using glass plat mould solvent (casting) evaporation technique. The dibuthyl phthalate was incorporated as a plasticizer at concentration of 30%w/w of dry weight of polymer and 4% of dimethyle sulphoxide (DMSO) was incorporated as a permeation enhancer. Backing membrane was casting by pouring and then evaporating 4% aqueous solution of PVA and PVP mixed with a solution and poured into glass molded plate and kept for 24 h at room temperature (25 °C).

Results: From the spectra it was confirmed that there is no interaction between drug and polymers because the IR spectra of all physical mixtures retains the principal drug peaks at 1624.12, 1570.11, 1062.81, 937.44 cm^{-1} for sitagliptin phosphate. From the FT-IR studies it was observed that there were no interactions between drug and their respective excipients. The compatibility between sitagliptin phosphate and polymers were confirmed by FT-IR Spectrophotometer. The formulated sitagliptin phosphate transdermal patches were evaluated for thickness test, weight variation test, drug content test were observed. The external morphology of the transdermal patch was analyzed using a scanning electron microscope. The samples placed on the stabs were coated finally with gold palladium and examined under the microscope at 1000 × and 1500 ×. The matrix kind of transdermal film of sitagliptin phosphate was prepared by solvent casting (evaporation) method using a combination of hydrophilic and lipophilic polymer. PVP is added to an insoluble film former, PVA that tends to increase its release rate. The resultant can be contributed to the leaching of soluble components, which leads to the formation of pore and then decrease in the mean diffusion path length of the drug molecules. PVP acts as a nucleating agent that retards the crystallization of the drug and enhances the solubility of the drug in the matrix by sustaining it in an amorphous form. *In-vitro* drug diffusion studies were carried out for the different formulations using Franz diffusion cell. The medicated films showed that drug release study in % cumulative release. The relationship can be established as STP1 > STP6 > STP3 > STP2 > STP4 > STP5. Because different ratios of polymer in film the percentage release can be varied. Drug polymer affinity will be a main factor that controls the release of drug from the formulation. Maximum percentage of drug release (i.e., 98.42%) was observed with formulation STP1 and the minimum (i.e., 48.21%) was found with formulation STP5.

Conclusions: In this study, different ratio of PVA and PVP transdermal sitagliptin phosphate patches were formulated using DMSO as a permeation enhancer. It can be reasonably concluded that sitagliptin phosphate could formulate into transdermal polymeric patches to prolong its release characteristics. Thus, the formulation STP 3 (PVA: PVP, 1:2) was found to be the best form of sustained release once a day formulation. PVP acts as nucleating agents that retards the crystallization of the drug and this plays a significant role in improving the solubility of the drug in the matrix by sustaining the drug in amorphous form. It undergoes rapid solubilization by penetrating into the dissolution medium. Thus, PVP was incorporated into film using mixture of other polymers and the suitability of the films was studied. The transdermal drug delivery system of sitagliptin phosphate was prepared by solvent casting (evaporation) technique.

PTP-11

A Study of Quetiapine Fumarate Nanoemulsion for Delivery into the Brain through Intranasal Route

Sneh Priya*[1], Marina Koland[1], Suchetha Kumari[2]

[1]Department of Pharmaceutics, NGSM Institute of Pharmaceutical Sciences, Nitte University, Deralakatte, Mangalore, Karnataka, India

[2]Department of Bio-Chemistry, K.S. Hegde Medical Academy, Nitte University, Deralakatte, Mangalore, Karnataka, India

snehpriya123@gmail.com

Introduction: Quetiapine fumarate is a short-acting atypical antipsychotic drug to treat schizophrenia, bipolar disorder, and major depressive disorder. It also has an antagonistic effect on the histamine H1 receptor. It has significant first-pass metabolism with the poor oral bioavailability of 9% and a half-life of 6 h. Hence, in the present study nanoemulsions of quetiapine were prepared for brain targeting through nasal administration. The nasal administration will avoid the first pass metabolism also provides targeting to the receptor site and bypasses the blood–brain barrier thereby enhancing bioavailability.

Methods: Nanoemulsions were prepared by utrasonication method by using isopropyl myristate as oil, tween 20, and propylene glycol as Smix (surfactant and co-surfactant mixture) and water. Nanoemulsion was evaluated for mean droplet size, poly dispersibility index (PDI), Zeta potential, and percentage drug content. *In-vitro* drug release was also performed and compared with the drug solution. The concentration of quetiapine in brain and plasma after intranasal nanoemulsion, free drug and per oral administration was studied in rat models.

Results: The average particle size and PDI was found to be 61–105 nm and 0.18–0.21 respectively. The zeta potential was −30 to −35 indicating formulations were stable. The drug content of formulations was found to more than 95%. The *in-vitro* drug release from pure drug solution and optimized formulation were found to be 100% and 45.15 ± 1.05% respectively within 6 h and after 24 h 100% drug release were seen from formulationA significantly higher level of drug was found in the brain with intranasal nanoemulsions of ropinirole compared to the intranasal free drug and the oral route. Intranasal nanoemulsions had a longer half-life in the brain than intranasally or orally administered a free drug.

Conclusions: Delivering quetiapine nanoemulsions through the intranasal route for the treatment of schizophrenia and bipolar disorder might be a new approach to the management of this condition.

PTP-12

Phytochemical Screening, *In-silico* Docking, *In-vitro* Antibacterial and Cytotoxicity Studies of *Azukia mungo* (l.) Masam

Akilandeswari Krishnan*, Vijayalakshmi Maruthamuthu, Gayatri Alagesan, Girija Muthaiah, Ruckmani Kandasamy

Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University – BIT Campus, Tiruchirappalli, Tamil Nadu, India

akilaaut@gmail.com

Introduction: *Azukia* genus plants rich in proteinaceous anti nutrients like tannins (especially condensed tannins) has been shown to have antibacterial activity against *Staphylococcus aureus* and antineoplastic activity against lung and liver cancer cells. Five types of procyanidins (condensed tannins) has already been isolated from *Azukia mungo* and structurally elucidated. But its

activity against the methicillin resistant *Staphylococcus aureus* (MRSA) has not yet been shown. Hence we focus our work in exploring the antibacterial activity against MRSA strain along with the investigation of anticancer activity against HeLa cells.

Methods: *Azukia mungo* seeds were collected and extracted. The extracted seeds were subjected to phytochemical screening to identify the chemical constituents. Qualitative identification of tannins in the extracts was performed through HPTLC and TLC methods using n-butanol: glacial acetic acid: water as solvent system. The antibacterial and anticancer activity was predicted using flexible (GEM dock software) docking of procyanidins as ligands against several MRSA receptors and cervical cancer responsible receptors. The MTT assay was used to make a assessment of tumor-inhibitory action of *Vigna mungo* extract of acetone and water on HeLa cells.

Results: Phytochemical screening of acetone and water extract showed the presence of alkaloids, tannins, flavonoids and steroids. In HPTLC, the peaks in the graph of the extract compared to the standard peak tannic acid were found to be in accordance with respect to their retention factors at 0.05 and 0.81. Higher docking energy implies good binding energy and hence more efficiency in blocking the activity of particular protein. The good binding energy of the ligand with active site of the receptor revealed −133.47 kcal/mol for MRSA receptor and cancer receptor −108.45 kcal/mol. For MRSA and cervical cancer maximum docking energy was exhibited between procyanidin A2 with 2YVW (penicillin binding protein receptor) and procyanidin B1 with HMG CoA reductase. This has been subsequently proved in the zone of inhibition of 27 mm and 17 mm, minimum inhibitory concentration of 62.5 μg/ml and 125 μg/ml and in cytotoxicity studies, HeLa cell viability was reduced significantly in 24 h treatment. In 200 μg, percentage cell viability of acetone extract was 52.54% and in 250 μg, percentage cell viability of water extract was 48.66%.

Conclusions: This study concluded that the natural compound from *Azukia mungo* was screened and its effectiveness against MRSA and cervical cancer were analysed. Thus natural products serve a good alternative for the development of novel natural product derived anti-MRSA and anticancer drugs.

PTP-13

Development of Colon Targeted Drug Delivery Systems of 5-Fluorouracil Microspheres

Kavitha Karuppaiyan*, Chandrasekar Jayakumar, Chithra Karthikeyini Anbalagan, Sudarvizhi Thanigaivel, Vishvaranjani Perumal

Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University – BIT Campus, Tiruchirappalli, Tamil Nadu, India

kavithaaut@gmail.com

Introduction: Specificity in targeting colon cancer can be achieved by polymeric coated drug delivery system. The conventional dosage forms are ineffective and toxic due to absorption & degradation of the active ingredient in the upper gastro-intestinal tract. 5-Fluorouracil, an anticancer drug, shows minimal release in upper GIT and rapid release in the colon. Among many drug carriers, the microsphere is one of the good approaches to controlled release dosage form in novel drug delivery system.

Methods: In the present study, five formulations of coated microspheres were formulated by the solvent diffusion method. The drug was coated first with HPMC second with guar gum (charge based technique) and outer most layer with ethylcellulose (solvent evaporation technique). The formulations were evaluated for surface morphology through scanning electron microscopy.

Results: The results showed a spherical structure and the particle size was found to be in the range of 4–6 μm. X-ray diffraction study results suggested the amorphous nature of drug present in the 5-FU microspheres. The drug release from the coated microspheres followed zero order kinetics. The layered microspheres were released after 6 h.

Conclusions: From the results of drug release it is evident that the drug will be released only in colon. Thus, Targeted drug delivery systems of 5 fluorouracil coated microspheres were prepared and evaluated for its efficiency.

PTP-14

Development and Evaluation of Drug Interaction Checker Web App for Enhancement of Patient Safety – Proto Design with Carbamazepine as Model Drug

Poornima Mookaiah*, Selvamani Palanisamy, Latha Subbiah

Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University – BIT Campus, Tiruchirappalli, Tamil Nadu, India

hai.mpoornima@gmail.com

Introduction: Carbamazepine is a narrow therapeutic drug is used to treat seizures and nerve pain such as trigeminal neuralgia and diabetic neuropathy. A drug interaction occurs when the effect of a particular drug is altered when it is taken with another drug or with food. The drug–drug interaction may make the drug less effective, eventually harmful and may cause unexpected side effects, or increase the action of a particular drug.

Methods: The drug interaction checker web app was developed using Java, Jquery, jsp and servlet, follows MVC architecture using Struts framework and back-end support extended with Oracle database server and Tomcat server as the web server and Eclipse as Interface Development Environment (IDE). This web app would identify and indicate potential harmful drug interactions and could explain the adverse effects of the identified drug interactions.The drug interaction checker is capable of displaying any possible beneficial/adverse interactions between multiple drugs prescribed in a prescription as well as common food items that could interact.

Results: The user has the flexibility to add new drugs in their prescription and to verify themselves for any possible interactions among them. This web app is very simple, intuitive and response to all category of users developed for a model drug carbamazepine will display the potential interactions with other drugs in the prescription with carbamazepine and could warn the risk of potentially harmful drug's side effects. This web app is user friendly, guided and allows users get things done with less effort and time.

Conclusions: The web app could act as a desk reference for both physicians as well as paramedical personnels and could avoid potentially harmful combinations during therapy would enhance patient safety.

PTP-15

Brain Targeted Delivery of Olanzapine through Solid Lipid Nanoparticles

Raahulan Sivarajakumar*, Jawahar

J.S.S. College of Pharmacy, (Constitutent College of JSS University, Mysore), Ootacamund, Tamil Nadu, India

sraahulan11@gmail.com

Introduction: Olanzapine is an atypical antipsychotic that belongs to thienobenzodiazepine class used orally in treatment of Schizophrenia, acute mixed or manic episodes in bipolar disorder and i.m. for control of agitation and disturbed behavior in schizophrenia or mania. It undergoes extensive first pass metabolism

with over 40% of the drug being metabolized before reaching the systemic circulation. Also, it has poor aqueous solubility (BCS Class II drug). It is associated with severe dose related side effects which include drug-induced parkinsonism, acute dystonic reaction, akathisia, tardive dyskinesia, and tardive dystonia. These side effects are seen at dosages that yield a beneficial effect on the symptoms of the disease. The severity of adverse events and/or lack of efficacy in considerable number of patients frequently results in poor patient compliance or termination of treatment. Use of lipid based drug delivery systems has led to effective development of many such compounds with acceptable oral bioavailability. Solid lipid nanoparticles (SLNs) have been explored extensively in drug delivery through various routes. The SLN based systems possesses characteristics of conventional carriers as well as some additional characteristics that obviate the drawbacks associated and reported for conventional systems.

Methods: Preformulation studies were carried using following procedures, during this evaluation possible interaction with various inert ingredients intended for use in final dosage form are also considered viz., solubility, compatibility, partition Coefficient studies etc.

Results: When olanzapine entrapped in SLNs with stearylamine were administered orally the $AUC_{(0-\infty)}$ was increased (5.71-fold) and clearance was decreased compared with that of olanzapine suspension.

Conclusions: To conclude microemulsion technique was suitable for producing solid lipid nanoparticles. Lipophilic drugs like olanzapine can be successfully incorporated into the lipid (glyceryl tripalmitate). The formulated solid lipid nanoparticles showed a significant increase (5 folds) in oral bioavailability compared to pure drug suspension. Higher relative bioavailability would be due to avoidance of first-pass hepatic metabolism by intestinal lymphatic transport, which circumvents the liver.

PTP-16

Effects of Pulsed Magnetic Field on Biochemical Parameters of *Hordeum vulgare* Seeds

Jayabarath Jayaraman*, Alagumathi Anbalagan, Kirthika Veeramalai

Department of Biotechnology, Pavendar Bharathidasan College of Engineering & Technology, Mathur, Tiruchirappalli, Tamil Nadu, India

Introduction: Magnetic field varying with time in a rhythmic manner usually generated by pulsed electric currents flowing through coils is called a PMF. In the present investigation an attempt has been made to study the treatment of dry barley seeds to continuous exposure of pulsed magnetic field and its effect on biochemical parameters.

Methods: Pulsed Magnetic Field Exposure: The pulsed magnetic field (PMF) used in the experiments were generated in a specially fabricated controlled magnetic field (CMF) enclosure. The 3 member coil system of the CMF enclosure, designed after the primary equations of Fansleau and Braunbeck, is made up of two sets of circular coils the inner two is being of large diameter and the outer two are of smaller diameter, all the four being mounted co-planar and co-axial. The four coils are wound with the same number of turns of enamelled copper wire, all the coils being electrically connected in 'series-aiding' configuration. The ratio of the diameter of the two sets of coils and also the separation (or spacing) in between them are so adjusted that the entire disc-shaped volume between the inner (larger) coils offers the most uniform (i.e., Homogenous) magnetic field. This configuration gives an estimated degree of homogeneity of about one part in 5000. This coil system of Fansleau and Braunbeck is a refined version of classical Helmholtz Two-coil system offering the most practical advantage of large volume of highly uniform magnetic field of the order 20–30 times that offered by a Helmholtz coil of identical physical dimensions. The dry barley seeds were exposed to pulsed magnetic field and its effect on biochemical parameters at intensity 1500 nT, wave form sine wave and frequencies of 100, 500, 1000 Hz for duration of 75 h.

Results: The results seem to reveal that the test plants mostly show an increase in biochemical parameters when compared to the control (not exposed to PMF).

Conclusions: Therefore it is evident that use of optimum level of magnetic field strength will definitely prove to be a pre-treatment catalyst in agriculture promoting vigor, growth and good yield of crops. This non-chemical alternative has many advantages such as protecting environment and in turn to offer safety to the applicator.

PTP-17

Formulation of Dietary Supplements: **Optimization, Evaluation and Its Toxicity Assessment**

Rajakumari Rajendran[1], Nandakumar Kalarikkal*[1,2], Sabu Thomas[1,3]

[1]International and Inter-University Centre for Nanoscience and Nanotechnology, Mahatma Gandhi University, Kerala, India

[2]School of Pure and Applied Physics, Mahatma Gandhi University, Kerala, India

[3]School of Chemical Sciences, Mahatma Gandhi University, Kerala, India

nkkalarikkal@mgu.ac.in

Introduction: It is impossible to find one consuming a well-balanced diet regularly. Somehow, one can expect the deficiency of certain nutrients in their regular diet. To overcome such drawback in the diet, the combination of vitamins and minerals as a dietary supplement in the form of bilayer tablet is proposed to see the various nutrients can find a place in one tablet when a normal man consumes the same.

Methods: The present work is to design a film-coated bilayer tablet in which one layer contains premix vitamins while the other one encompasses the premix minerals.

Results: The uniquely formed bilayer tablet was assessed for the physiochemical properties, microbial load and stability studies. The optimized bilayer tablet results found to be within the limits.

The purpose of introducing a bilayer is to decrease the processing time, cost and increase the stability and expected to release the vitamins and minerals in the gastrointestinal tract.

Conclusions: The prepared tablets are observed to be toxic free and nutrient additive.

PTP-18

Preparation of Mosquito Repellant Cream from *Vitex negundo*

Vijayakumar Lakshminarayanan*, Sreelakshmi Udhayakumar, Bala Murali Raju, Mothilal Dhanapal, Reethika Asokan

Department of Biotechnology, Bannari Amman Institute of Technology, Sathyamangalam, Tamil Nadu, India

vijayakumarl@bitsathy.ac.in

Introduction: Mosquitoes are major threat to human beings. Thousands of this species feed on the blood of the host, thereby causing diseases. Due to the over population of this species, they cannot be killed completely but we can protect ourselves from them by using repellents. *Vitex negundo* is a medicinal plant that grows abundantly in south asia. They have mosquito repellent property. In agriculture it is used as pesticides. In pharmaceutical industry it is used as a remedy for cough, skin diseases, liver disorders, etc. Previously, we have described the mosquito repellent

property of the plant and the repellent can be prepared using the extract.

Methods: In the present study, we aim to study further the effects and activities of the most abundant and the versatile herb *Vitex negundo.* Knowing that the herb has the property to repel mosquitoes, it is made into a repellent cream for mosquitoes. The soxhlet apparatus is used in order to extract the plant extract along with the solvent, which is followed by vacuum evaporation (40–50 °C under reduced pressure) technique to get pure extract. The pure extract is formulated into a cream that repels mosquitoes using some safe chemicals like natural wax, glycerin, etc.

Results: Plant extracts acted as potential mosquito larvicides that have larvicidal property against mosquito larvae. Sterility test that is the plate count method is done and minimal numbers of colonies were observed. pH and viscosity of the cream is noted. 7 days and 21 days test for the cream on our own skin is done and the safety of the cream is verified.

Conclusions: All parts of the plant, from root to fruit, possess a number of phytochemical secondary metabolites that impart variety of medicinal uses to the plant. It is interesting to note that a single plant species finds use for treatment of a wide spectrum of health disorders in the traditional and modern medicine. The study also suggests that the cream can also be used as a moistening cream. Further extensive studies are required to demonstrate the complete effectiveness of the cream against the mosquitoes.

BTP-01

Genetic Analysis and Characterization of Vp7 Gene of Various G Types in Human Rota Viruses – An *In-silico* Approach

Ponnambalam Arun[1,3], Vidya Padmanabhan[1,2], Palani Gunasekeran[3], Selvaraj Gracy Fathima[3], Kaveri krishnasamy[3]

[1]Department of Microbiology, Bharathiar University, Coimbatore, India

[2]Department of Microbiology, D.G. Vaishnav College, (Autonomous), Arumbakkam, Chennai, India

[3]King Institute of Preventive Medicine & Research (KIPM&R) Guindy, Chennai, India

arunpatchai@yahoo.co.in, kaveriraj_1967@yahoo.co.in

Introduction: The genus Rotavirus, a member of the family Reoviridae. There are eight species of this virus, referred to as A, B, C, D, E, F, G and H. Rotavirus A, the most common species, causes more than 90% of rotavirus infections in humans. It has 11 segments of double-stranded (ds) RNA as genome and each segment is a gene, codes for one protein, except segment 9, which codes for two. There are six viral proteins (VPs) or structural proteins are called VP1, VP2, VP3, VP4, VP6 and VP7 and six nonstructural proteins (NSPs), are called NSP1, NSP2, NSP3, NSP4, NSP5 and NSP6. Based on the antigenicity of outer capsid proteins VP7 and VP4, two independent serotypes, i.e. G-serotype and P-serotype and the genotypes, i.e. G-genotype and P-genotype, respectively, were developed. These are referred to also as "G-type" and "P-type". VP7 is encoded by RNA segment 7, 8, or 9 and comprises 326 amino acids. VP7 constitutes smooth surface of the outer capsid. Since hospitalizations due to rotavirus infections is around 40,000 children each year in India and the death of over 1,50,000 the present study was done to know the circulating strains of G type origin and epidemiology of the circulating genotypes of rotaviruses infections among children.

Methods: The VP7 gene sequences of various G types were collected and were analyzed and characterized by *In-silico* methods. The sequences were subjected for various comparative analysis using BLAST and the phylogenetic relationships were calculated using neighbour-joining method in MEGA5. The antigenetic regions of all the subtypes were analyzed using BioEdit package. Further characterization of the VP7 genes were done by using different online and offline tools and softwares.

Results: The phylogenetic tree showed that each G type was grouped into individual clades. The bioedit analysis of three different antigenic regions (Region A (87-101), Region B (142-152) and the Region C (208-221)) indicated the conserved sites which are present in all the G types.

Conclusions: This study examined the genetic relatedness of all VP7 proteins of human rotavirus, even though all strains of rotavirus showed identity of sequences to viruses belonging to same G-type and G type is having its own conserved set of sequences. Because of that, each G type is grouped into individual clades. The comparison of the antigenic sites of all the G types, many positions showed changes. But, some positions are highly conserved like, in the Region A (87-101), I93, D95, W98, in the Region B (142-152), L150 and in the Region C (208-221), T209, T210, F215, E216, A219. Based on these conserved antigenic sites, we can predict possible drug candidates by using virtual screening and other methods in further. This will help to findout drugs for the treatment of human Rota virus which is not having any currently available drugs.

BTP-02

Molecular Docking Studies of Novel Phytochemical Compound Against HBV Polymerase and HBSAG

Krishnanand Nagarajan*[1], Srividhya[2], Sathish Kumar Marimuthu[1], Selvamani Palanisamy[3], Latha Subbiah[3], Arputha Bibiana[3],

[1]Department of Pharmaceutical Technology, Anna University – BIT Campus, Tiruchirapalli, Tamil Nadu, India

[2]Department of Biotechnology, Karpaga Vinayaga College of Engineering and Technology, GST Road, Chinna Kolambakkam, Palayanoor PO, Madurantagam Taluk, Kancheepuram District, Tamil Nadu, India

[3]Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India

krishwrites@gmail.com

Introduction: Chronic infection with hepatitis B virus (HBV) constitutes a major global threat to public health, causing substantial disease burdens such as liver cirrhosis and hepatocellular carcinoma.

Methods: HBV is a member of the Hepadnaviridae family of viruses, the remarkable events of the HBV lifecycle include cellular entry, disassembly, replication, assembly, and release. These multiple complex steps in the HBV life cycle are potential targets for novel therapies. In specific the role of two main proteins HBV polymerase and HBsAg are crucial. Combined targeting of multiple mechanisms is particularly attractive.

Results: In this present work, we focus on the protein–ligand interaction between the phyto derived amentoflavone with HBV polymerase and HBsAg. Here the active site of the proteins will be found using docking programs and software such as Autodock and visualization by Pymol.

Conclusions: The exact confirmation and configuration of the ligand will be calculated to find the best pose with minimum binding energy to develop potential drug molecules against the disease.

BTP-03

Methods of Extraction and Quantification of Protein and Polyphenol from Macroalgae

Aniskumar Mani[1], Santhiya Tamilselvam[1], Sangeetha Rajasekaran[1], Satthish Kumar Vellaingiri[1], Latha Subbiah[2]

[1]Department of Biotechnology, Pavendar Bharathidasan College of Engineering and Technology, Tiruchirappalli, Tamil Nadu, India
[2]Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India

Introduction: In this study, we develop optimized methods for the extraction of soluble proteins in the brown algae *Sargassum wighatti,* red algae *Halymenia sp*., green algae *Ulva reticulate.* This unique study however specifically examines the various different extraction parameters including, extraction solvent, temperature and duration.

Methods: Protein and polyphenol extraction optimisation methods involved the use of different extraction solvents (deionized water, ethanol and NaOH), durations (1, 16, 24 h) and temperatures (4 °C and room temperature). We confirmed the presence of protein and polyphenol by using various conformation techniques.

Results: The Kjeldahl method used to determine the total protein content of seaweed. Comparison were then made between the *Sargassum wightti, Ulva reticulta, Halymenia sp.* From this study, we observed that the soluble protein content of the brown, red, green seaweeds ranged from 18.62 – 15.81, 21.17 – 20.09, 14.93 – 12.06 mg/g dw respectively. The green seaweed *Ulva reticulate* yield the highest level of protein content when using the deionised water as a solvent in the overall method. We analysed the deionized water yields the high level of protein content when compared with the ethanol and NaOH in the overall method. Further development in this study, we analyse the total protein and polyphenol content from different seaweeds at different seasonal condition.

Conclusions: Protein and polyphenol extraction optimization methods involved the use of different extraction solvents, durations and temperatures for the marine brown algae *Sargassum wighatti,* green algae *Ulva reticulate* and red algae *Halymenia.* Large variation in extracted protein levels were observed among red, brown and green seaweeds. In this study the brown, red, green seaweeds demonstrated that the soluble protein content ranged from 18.62 to 15.81, 21.17 to 20.09, 14.93 to 12.06 mg/g dw respectively. An extraction technique using deionized water, carried out at 4 °C for room temperature in 24 h was chosen as an optimized method for protein extraction. While using deionized water as a solvent for extraction, green seaweeds yields the highest levels of protein content when compared with brown and red seaweeds.

BTP-04

An Attempt to Develop Seaweed-based Treatment Technology for the remediation of Cr(VI) Heavy Metal in Aqueous Solution Equilibrium and Kinetic Studies

Kumaraguru Kannan*[1], Sureshkumar Periyasamy[2]
[1]Department of Petrochemical Technology, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
[2]Department of Biotechnology, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
kguru_2k2@yahoo.co.in

Introduction: In this study, the biosorption of chromium (VI) on *Sargassum myriocystum*, brown marine algae, has been investigated in a pharmaceutical industry wastewater.

Methods: The influence of operating parameters such as sorbent size (0.176–1.503 mm), sorbent dosage (30–70 g/l), temperature (25–45 °C), contact time (2–10 h) and agitation speed (50–250 rpm) on the sorption of Chromium (VI) were analyzed using response surface methodology (RSM) by Design Expert (Stat-Ease, USA).

Results: A full factorial central composite design (CCD) was successfully employed for experimental design and analysis of the results. The optimum biosorption conditions were determined as sorbent size (1.503 mm), sorbent dosage (3 g), temperature (25 °C), contact time (10 h) and agitation speed (250 rpm). The Langmuir and Freundlich isotherm models were applied to the equilibrium data.

Conclusions: A higher value coefficient of determination R^2 0.9548 evidenced the fitness of response surface methodology in this work. The thermodynamic parameters like standard Gibb's free energy (ΔG^0), enthalpy (ΔH^0) and entropy (ΔS^0) were evaluated.

BTP-05

Simulation and Studies on Fermenter using C Program

Aniskumar Mani[1], Latha Subbiah[2], Selvamani Palanisamy*[2]
[1]Department of Biotechnology, Pavendar Bharathidasan College of Engineering and Technology, Tiruchirappalli, Tamil Nadu, India
[2]Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
pselvamani@hotmail.com

Introduction: Design of Bioreactors is a complex task, relying on scientific and engineering principles and many rules of thumb. When considering the design of vertical stirred vessels, the main variables in geometry are the height-to-diameter ratio, the number, type, dimensions and positions and number of impellers, and the design and location of coils for heating and cooling. Computational approaches using C programming single or two tyre architecture builder which runs even independent of operating system and help the investigators to take advantage of large, complex data sets into rigorous fashion to reach valid design conclusion. We developed software was validated for selection of economic materials. Generally glass is an ideal material for laboratory equipment because it provides smooth surface, non toxic, corrosion resistant and cost effective whereas pilot and industrial scale vessels are constructed by using ferrous and non ferrous materials. The commonly used ferrous metal like stainless steel (SS304, SS316) is used to limit the corrosion. The reactor is designed to meet specific needs of cells produce value-added products with specific quality attributes at minimum cost.

Methods: Design driver software was developed for design of batch type (STR) fermenter, to control the instrumentation process parameters necessary to develop and operate a variety of fermentation processes using C- language as a working platform. The scale up effect has been investigated based on the volume and H/D ratio for bench to plant scale vessel using C-programming. The design includes parts of fermenter such as shell, two different heads, jacket type, shaft, impeller, rothman clamp and specify the dimension of each components, power required to operate the agitator and total weight of the fermenter.

Results: The results are predicted with the software has been verified by solving fundamental equation and comparison with experimental data, these results are important for the cost-effective design of fermenter using different head. The results were evaluated in which Elliptical head is found to be cost effective as compared with Torispherical head due to its less weight.

Conclusions: Design was performed to validate head type and number, dimension of shell, jackets, shaft, agitation speed and power requirement, thus convergence of computational design is fully time independent and has been monitored to ensure that the result provided with elliptical head model could be economically

suitable for large scale production, due to the reduction of total weight of the vessel when compared with Torispherical head.

BTP-06

Molecular Docking of the Phytoconstituents of *Lactuca runcinata* DC for its Atherosclerosis Activity

Jeyaraman Amutha Iswarya Devi*, Arumugam Kottai Muthu
Department of Pharmacy, Annamalai University, Annamalai Nagar, Chidambaram, Cuddalore (Dist.), Tamil Nadu, India
shreeeenkay@yahoo.com

Introduction: New medication disclosure is considered extensively as far as two types of investigational activities, for example, investigation and exploitation. The present study find out the efficacy of phytoconstituents in *Lactuca runcinata* DC. for its inhibition action against cholesteryl esterase (PDB: 1F6W) using computational molecular docking studies.

Methods: The *in-silico* docking analysis were done by using GLIDE software v5.5 developed by Schrödinger running on Red Hat Enterprise Linux 5 workstation.

Results: The outcomes demonstrated that all the phytoconstituents indicated the binding energy range between −7.31 kcal/mol and −2.73 kcal/mol when compared with standard drug Atorvastatin (−7.52 kcal/mol). Particularly the compounds Octadecanoic acid, ethyl ester was found the docking score of −7.31 and 2,6,10,14-Hexadecatetraen-1-ol, 3,7,11,15-tetramethyl-, acetate, (E,E,E)- were found the docking score of −7.02.

Conclusions: All the phytoconstituents showed cholesterol esterase inhibitory activity, these molecular docking investigation could be lead to the further advancement of effective cholesterol esterase inhibitors for the treatment of atherosclerosis.

BTP-07

Docking Studies to Assess the Effect of H274Y Mutation in A/H1N1 Neuraminidase

Gracy Fathima Selvaraj[1,2], Velmurugan Devadasan[3,4] Gunasekaran Palani[1], Kaveri Krishnamoorthy[1], Princy Vijayababu[2], Sundara Baalaji Narayanan*[2]
[1]Dept. of Virology, King Institute of Preventive Medicine, Guindy, Chennai, Tamil Nadu, India
[2]Laboratory of Structural Biology, Department of Bioinformatics, Bharathiar University, Coimbatore, Tamil Nadu, India
[3]Centre of Advanced Study in Crystallography and Biophysics, University of Madras, Guindy Campus, Chennai, Tamil Nadu, India
[4]Bioinformatics Infrastructure Facility (BIF), University of Madras, Guindy Campus, Chennai, Tamil Nadu, India
sundarabaalaji@gmail.com

Introduction: Influenza virus is a respiratory viral pathogen that causes yearly epidemics in tropical and subtropical countries. In 2009 A/H1N1 is the subtype of influenza A virus that was the most common cause of human influenza (flu). The genome of influenza A consist of eight segments of negative-sense, single-stranded RNA, which encodes 11 proteins. Neuraminidase (NA) is a viral surface glycoprotein coded by the 6th RNA segment. It plays an important role in the release of progeny virus to healthy cells and thus facilitates virus spread within the respiratory tract. The design of NA inhibitors (NAIs) was based on the conserved structure of the NA active site. NAIs interrupt the virus replication cycle by preventing the release of virus from infected cells and may interfere with the initiation of infection. Oseltamivir (marketing name Tamiflu) is a selective neuraminidase inhibitor of the influenza viruses A. The oseltamivir-resistance trait is caused by a point mutation (H274Y) in the virus neuraminidase.

Methods: Normal and H274Y mutated structures were predicted by homology modeling. The docking studies were carried out by using docking software Schrödinger. The scores and the binding energies were calculated for oseltamivir to findout the effect of H274Y mutation.

Results: The structures were predicted by homology modeling. The superimposition of the predicted structures showed the deviation at the mutation site. While docking the structures with oseltamivir, the binding energies were differed. The structure without mutation showed less binding energy than the mutated one.

Conclusions: This study suggests that the binding of oseltamivir with neuraminidase is disturbed because of the mutation at H274Y. This mutation did not directly affect the bond formation. Instead, it weakens the bonding which leads to the resistance.

BTP-08

***In-silico* Based Target Screening of the Alanine racemase Enzyme for Novel Antibacterial Drug Discovery**

Unni Jayaram*, Mohammed Afzal Azam
Department of Pharmaceutical Chemistry, JSS College of Pharmacy (Affiliated to University of JSS, Mysore), Udhagamandalam, Tamil Nadu, India
jayaramkvt@gmail.com

Introduction: Antimicrobial chemotherapy has been a leading cause for the dramatic rise of average life expectancy in the twentieth century. However, resistance of microbes to antibiotic drug therapy are an increasing public health problem. Hence, there is a need to develop novel class of antibiotics with new mechanisms of action. The enzyme Alanine racemase belongs to fold type-III PLP dependent enzyme that catalyzes the conversion of L-alanine to D-alanine, plays significant role in synthesis of peptidoglycan in bacterial cell wall. They are mainly present in prokaryotes and are absent in mammals. The known drugs that inhibit Alanine racemase include D-cycloserine, O-carbamyl-D-serine, β-chloro alanine, β,β,β-trifluro alanine, β-chlorovinyl glycine, alaphosphin, O-acetyl-D-serine, β-D-fluro alanine etc.

Methods: The *in-silico* study of the known and the reported drug molecules towards the alanine racemase receptor was carried out. The crystal structures of the bacterial enzyme Alanine Racemase (PDB ID 4A3Q) was retrieved from Protein Data Bank and the active sight study for possible interactions was carried out using the Molecular modelling software Schrodinger Suite Maestro version 9.6, 2014. The docking of the standard drugs with the receptor were performed and ligand–residue interaction were studied. The Qikprop data, docking scores and Ligand interactions were recorded. Schrodinger Suite 2014-3 containing the Maestro 9.9.013 was used as the working interface with AlaR (PDB ID: 4A3Q) and reported inhibitors of AlaR including D-cycloserine. Additional modules in Schrodinger Release 2014-3 include Prime-version 3.7, LigPrep-version 3.1, and SiteMap-version 3.2 (Schrodinger, LLC, New York, NY, 2014). In the Small-Molecule Drug Discovery Suite 2014-3: Glide-version 6.4 (Schrodinger, LLC, New York, NY, 2014) was also used in the experimental procedures. Molecular preparation and docking experiments were performed with selected target, in Maestro.

Results: The docking of the reported and known AlaR inhibitors with native Alanine racemase enzyme revealed a docking score ranging from −1.72 to −5.82. The PRIME MMGBSA DG is calculated to be ranging from 19.47 to −44.63 kcal/mol using the above mentioned technology. A comparison of different docking poses from the standard and reported AlaR inhibitors exhibited hydrogen bonding network with Lys39, Hie168 and PLP1039, and these residues belongs to the amino acid stretch that forms the catalytic domain of the AlaR enzyme (PDB ID: 4A3Q). The catalytic binding pocket of Alanine Racemase was marked by the

presence of amino acid residues like Lys39, Tyr354, Hie168 and the Tyr43. The co-factor PLP 1039 responsible for the catalytic activity of the enzyme constitutes the central region of binding pocket. It was came to notice that none of the standard drugs available was showing receptor specificity and selectivity, and even reported incidences of drug resistance and severe toxic side effects. The known standard inhibitor, D-cycloserine was showing prominent H-bonding interaction with Lys39 and Hie168 residues. It was also exhibiting a docking score of −2.61 with PRIME MMGBSA DGbind value of −37.78 kcal/mol. the hydrogen bonding interaction was exhibited with the residues Lys39 and PLP1039. The conformational changes brought by this interaction will play a prominent role in enzyme inhibitory action. However, the maximum the docking score of −5.82 was shown by the molecule DL-(1-amino-2-propenyl) phosphonic acid with PRIME MMGBSA DGbind value of −44.63 kcal/mol. This molecule exhibited hydrogen bonding interaction with residues Lys39 and Hie168.

Conclusions: The *in-silico* study played a prominent role in correlating the structural features of the reported and standard drug molecules towards the concerned receptor. The data gave relevant features regarding the known molecules and approaches for designing novel heterocyclic antibacterial agents. This *in silico* target based approach will help in designing novel chemical entities targeting specifically and selectively towards the alanine racemase enzyme with minimal side effects.

BTP-09

QSAR Analysis of Second Generation Analogues of the Cancer Drug Clinical Candidate Tipifarnib for Anti-Chagas Disease

Meghshyam K. Patil[1], Shikha Lalwani*[2], Prachi Chawla[2], Mahajan[3], Vijay H. Masand[3],

[1]Department of Chemistry, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Sub-Campus Osmanabad, Maharashtra, India

[2]Department of Chemistry, G.V.I.S.H., Amravati, Maharashtra, India

[3]Department of Chemistry, Vidya bharati Mahavidyalaya, Amravati, Maharashtra, India

shikhalalwani001@gmail.com

Introduction: Chagas disease, a disease usually spread by contact with an infected triatomine bug, is a neglected parasitic disease that can cause serious heart and stomach illnesses. Its major presence is in the tropical regions viz. Africa and Latin America, affects more than ten million peoples each year. *Trypanosoma cruzi* (*T. cruzi*), the protozoan parasite, is the causative agent of Chagas disease. After infection, generally, the individuals become a permanent host to the parasite due to the lack of effective cure in the chronic stage of the disease. The chemotherapy relies on toxic drugs like nitrofuran, nifurtimox, benznidazole and the nitroimidazole. The situation has worsened with the advent of resistance against nifurtimox. Therefore, search for a new therapeutic agent or modification of existing one to curb Chagas disease is essential.

Recently, Tipifarnib, a well-known anti-cancer agent, was found to effectively inhibit *T. cruzi*. Its mechanism of bio-action involves disrupting sterol biosynthesis by inhibition of lanosterol 14R-demethylase (Tc-L14DM). *T. cruzi* amastigotes (the the life cycle stage that growsin mammalian host cells) exploits ergosterol as a significant constituent for synthesis of their membranes and cannot use host cell derived cholesterol. The advantages like high degree of oral bioavailability, desired pharmacokinetic properties, and good tolerance in humans make it an attractive lead molecule. Due the presence of a chiral center, tipifarnib exists in two stable isomeric forms, which are expected to have different affinities for Tc-L14DM, and probably only single isomer is bioactive form. In addition, separate analysis of pharmacokinetic and toxicity profiles of both the compounds would be required for drug candidate selection. This significantly reduces its potential as a drug candidate.

Methods: The dataset consists of thirty-three tipifarnib analogues with a variety of substituents at different positions. The EC_{50} (nM) values were converted to pEC_{50} (M) before QSAR analysis.

QSAR methodology: The structures were drawn using ChemSketch 12 freeware followed by energy minimization using TINKER employing MMFF94. Then, PowerMV, CDK and PADEL and e-Dragon were used to calculate descriptors. The descriptor pool consists of more than 18,000 descriptors. Objective feature selection was employed to eliminate the constant, near constant, highly correlated ($|R| > 0.80$) and redundant variables, followed by subjective feature selection using genetic algorithm in Weka. Before feature selection, the dataset was divided in training (80%) and prediction (20%) set randomly for external validation. Multiple splittings were performed to create multiple models to capture the maximum information.

Results: The GA-MLR models along with their statistical parameters are as follows:

Model-1: $pEC50 = 11.5637(\pm 1.3287) + 0.8277(\pm 0.3836)$*KRFPC2667 $- 0.0123(\pm 0.0038)$*QXXm

$N_{tr}=27$, $N_{ex}=6$, $R^2_{tr}=0.7913$, $R^2_{adj}=0.7739$, $RMSE_{tr}=0.3963$, $RMSE_{cv}=0.4381$, $RMSE_{ex}=0.2082$, $s=0.4204$, $F=45.4933$, $Q^2_{loo}=0.7449$, Q^2–$F^1=0.9341$, Q^2–$F^2=0.9287$, Q^2–$F^3=0.9424$, $CCC_{ex}=0.9650$, $MAE_{tr}=0.3124$, $MAE_{cv}=0.3467$, $MAE_{ex}=0.1578$, $R^2_{ext}=0.9402$, $Q^2_{LMO}=0.6718$

Model-2: $pEC_{50} = 8.206(\pm 3.023) + 9.076(\pm 5.259)$*HATS6e $0.011(\pm 0.005)$*QXXm

$N_{tr}=27$, $N_{ex}=6$, $R^2_{tr}=0.7506$, $R^2_{adj}=0.7298$, $RMSE_{tr}=0.4332$, $RMSE_{cv}=0.4854$, $RMSE_{ex}=0.4863$, $s=0.4595$, $F=36.1171$, $Q^2_{loo}=0.6869$, Q^2–$F^1=0.6402$, Q^2–$F^2=0.6110$, Q^2–$F^3=0.6858$, $CCC_{ex}=0.8617$, $MAE_{tr}=0.3309$, $MAE_{cv}=0.3760$, $MAE_{ex}=0.4195$, $R^2_{ext}=0.8656$, $Q^2_{LMO}=0.6806$

Conclusions: In conclusion, the robust QSAR models with good predictive ability indicate that activity has good relation with number of $-OCH_3$ group.

BTP-10

In-silico Analysis of Bioactive Flavonoids as Potential Inhibitors of Bcl-2 Protein

Harihara Sudhan, Kaviya Selvaraj, Mani Vasanthi, Ronaldo Anuf Alexander*

Department of Biotechnology, Kamaraj College of Engineering and Technology, Virudhunagar, Tamil Nadu, India

ronaldoanuf@gmail.com

Introduction: The Bcl-2 proteins play an important role in regulating apoptosis. Blocking Bcl-2 protein may offer an effective therapy for treating cancer. Here we report the activity of flavonoids from sour plants against the Bcl-2 protein. Flavonoids distributed widely in sour plants has potent antioxidant and anti-apoptotic inhibitory property. It is important to narrow down the choice of ligand molecules using *in-silico* tools before identifying the right molecule and analyzing their potential using *in-vitro* and *in-vivo* methods.

Methods: Five flavonoids were narrowed down from fifty flavonoids in selected sour plants based on the probable biological spectra estimated with the help of PASS tool and the inhibitory property evident from molecular docking studies with anti-apoptotic protein Bcl-2. The drug relevant property and toxicity profile of the selected compounds were tested using OSIRIS and LASAR tools.

Results: The predicted results revealed that Gallocatechin (flavonoid of sour plant *Magnifera indica*) has a greater binding affinity with Bcl-2. Gallocatechin also clears the toxicity evaluation tests and exhibited an overall drug score of 0.81.

Conclusions: The predicted results suggest that Gallocatechin could be a potent inhibitor of Bcl-2. However, it has to be further validated using *in-vitro* and *in-vivo* studies, to suggest the greater potency of Gallocatechin to inhibit the apoptotic protein Bcl-2, which could make gallocatechin as a lead drug molecule in treatment of cancer.

BTP-11

In-silico Study of Pinocembrine and Chrysin on Vitiligo Targeting Proteins

Thenmozhi Marudhadurai*
Department of Biotechnology, Selvam College of Technology, Namakkal, Tamil Nadu, India
thenmozhi.marudhadurai@gmail.com

Introduction: Vitiligo it is a de-pigmentation disorder. The root cause still unknown remains enigma to everyone. Autoimmunity, oxidative stress are said to be the major reasons for developing de-pigmentation in vitiligo patients. In this present study two target proteins based on the literature survey, inhibiting/activating selected proteins leads by honey components (Pinocembrine, chrysin) to control further de-pigmentation in vitiligo patients.

Methods: In this paper deals with the computational docking study performed for Pinocembrine and Chrysin against AMPKII and Human Monoamine Oxidase-A enzyme. Autodock software used to study the binding affinity and protein–ligand stability. Based on its score binding affinity were studied, and through hydrogen and hydrophobic interactions protein–ligand stability were studied. Since protein–ligand interactions plays significant role in structure based drug design.

Results: Pinocembrine and Chrysin showed higher binding affinity towards its target proteins AMPKII and Human MAO-A enzyme.

Conclusions: According to this computational docking study the protein–ligand properties used to ensure the results for further *in-vivo* and *in-vitro* studies to promote these molecules as a conventional therapeutic molecule.

BTP-12

QSAR Studies on Neuraminidase Inhibitors Using Non-linearly Transformed Descriptors

Sathish Kumar Marimuthu*, Selvamani Palanisamy, Latha Subbiah
Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
msathishkumara@gmail.com

Introduction: An important goal in computer-aided design is to find a correlation between the structural features of ligands and their biological activity i.e. ability to bind to a specific target proteins. Neuraminidase (NA) is a glycoprotein found on the surface of Influenza A virus that is involved in the process of releasing new progeny of virions by cleaving the terminal sialic acid residue from the surface of infected cells. Therefore, NA is an interesting potential target to design promising NA inhibitors to serve as antiviral agents for preventing viral propagation.

Methods: The main objective of 3D QSAR models is to allow the prediction of biological activities of untested or novel compounds to provide insight into relevant and consistent chemical properties or descriptors (2D/3D) which defines the biological activity. In this study, a data set of neuraminidase inhibitors of Influenza A virus (based on the Ki value) was employed from Binding db in the construction of quantitative structure–activity relationship (QSAR) model using 3D QSAR software.

Results: From the best compounds, docking analysis is perform with a suitable target to find an interactions between the protein–ligand using Autodock 4.The present study was aimed at deriving the predictive 3D QSAR models capable of revealing the structural requirement for Neuraminidase inhibitors.

Conclusions: Models developed in this study have potential application in the prediction of binding affinity for the newly synthesized compounds.

BTP-13

Biological datasets to Pharmaceutical Drug Discovery: A Machine learning approach

Deepak Balaji Thimiri Govinda Raj*, T.S. Govinda Raj
Thimiri Consulting Group (DTCG™) Headquarters, India
Deepak.Balaji@BITSAA.org

Introduction: Biological systems analysis and systems biology approach is currently well studied field related biological sciences and disease studies. Such type of analysis and research studies has now been expanded towards personalized medicine and drug discovery.

Methods: In order to contribute for system biology datasets towards pharmaceutical research and drug discovery, it is essential to correlate and infer the Big Datasets for better understanding. At the same time, such analysis is not limited to correlation but extended to comparative and comprehensive analysis of Big Datasets.

Results: Use of statistical methods and probability are useful for inferring results but are limited with respect to predictive analysis. It is highly cumbersome if the datasets are large in number (greater than million datasets). Particularly, pharmaceutical industries work on the datasets with more than a million hits and use of statistical approaches for such predictive analysis is limited. Hence, machine learning approach has been used to perform several predictive and comparative analyses.

Conclusions: Envirotransgene™ Biosolutions Global is studying and implemented machine learning algorithms for biological dataset analysis. Herein this communication, We propose comprehensive list of machine learning approaches that we implement for the predictive big data analysis for pharmaceutical drug discovery.

BTP-14

Apoptotic Effect of *Tephrosia tinctoria* Pers in Breast Cancer Cell Lines

Rajaram Krishnasamy[1], Sobana Mohan[1], Dhivya Sridaran[2], Sony Das[1], Kavitha Sivaguru[1], Kumpati Premkumar[2], Sureshkumar Periyasamy*[1]
[1]Department of Biotechnology, Anna University, BIT Campus, Tiruchirappalli, Tamil Nadu, India
[2]Department of Biomedical Science, Bharathidasan University, Tiruchirappalli, Tamil Nadu, India
biorajaram@gmail.com

Introduction: Breast cancer is a growing health problem due to the urbanization and environmental change. Conventional chemotheraphy has many side effects. Herbal medicines along with the chemotheraphy can rectify the side effects. Currently many researchers are focussed on the plant based anticancer drug development. The objectives of this study were to identify the apoptotic inducing potential of *Tephrosia tinctoria* Pers. in breast cancer cells.

Methods: Apoptosis induction of *T. tinctoria* was identified by MTT assay, Trypan Blue assay, Hoechst 33258 staining. Gene expression of specific apoptotic genes were analysed by SQ-RT-PCR.

Results: *In-vitro* antiproliferative study showed 50% inhibition of MCF-7 cell 75 μg/ml of acetone extract which is very low when compared to other plant-based drugs that induce cell death. The images of cytomorphological changes of the apoptotic cells by Hoechst staining as well as DNA damage proved that acetone extract of *T. tinctoria* inhibited growth of MCF-7 cells and triggered apoptosis. RT-PCR results demonstrated a down regulation of Bcl-2 and survivin, with no change in the expression of Bax which depicts that apoptosis might take place by the activation of extrinsic pathway. These results substantiate the presence of potent bioactive compounds in the acetone extract of *T. tinctoria* that could be responsible for its anti-proliferative activity and induction of apoptosis against breast cancer cell line (MCF-7).

Conclusions: These results suggest that *T. tinctoria* could be considered as a source of drug that could improve the current chemotherapeutic regimen against breast cancer.

MCP-01

Synthesis OF TiO_2 Nanoparticles Using Biological Method And Fabrication of Wound Healing Patches

Atmajah Bala[1], Narendhar Chandrasekar*[1], Aishwarya Chakavalapil[1], Dhivya Parameshwari[1], R. Balaji[1], Rajesh Thanga Pichyappa[2]

[1]Department of Nanoscience and Technology, Sri Ramakrishna Engineering College, Coimbatore, Tamil Nadu, India

[2]Department of Biotechnology Anna University, BIT Campus, Tiruchirappalli, Tamil Nadu, India

narendharc@gmail.com

Introduction: Titanium dioxide nanoparticles have wide applications. It is a lustrous transition metal which has wide applications in medical field, military, industrial process and aerospace. Titanium dioxide in its nanosize, exhibits stronger corrosion resistance, stability, biocompatibility and antimicrobial activity due to their high surface area to volume ratio, and high fraction. In the current study the titanium dioxide nanoparticles are synthesized and its antimicrobial activity is studied.

Methods: The synthesis methods include biosynthesis, ball milling, and wet chemical methods. The green synthesis is done using the green tea extract which contains high polyphenols. Advantages of adopting green synthesis are less toxic chemicals are used and produced, high atom economy, degradable waste products are obtained and the energy requirement for is low.

Ball milling is a top down approach synthetic method. It uses mechanical energy to reduce the size of the particles. There are no surfactants or reducing agents used hence it does not require washing of the particles to remove the impurities conserving the energy.

Wet chemical method is an easy method for synthesizing nanoparticles in room temperature. It requires low energy for the synthesis of nanoparticles and this is the highly used methodology for nanoparticle fabrication.

The synthesized particles and Chitosan is mixed together and film is formed by air drying it for 2 h.

Results: The synthesized particles are characterized using UV–vis spectroscopy, DLS, FT-IR, SEM, XRD. The antimicrobial tests are done using *Staphylococcus Aureus* and *Serratia marcescence* by Kirby Bauer's technique in blood agar. Resistance to antimicrobial agents (AMR) has resulted in increased morbidity and mortality from treatment failures and increased health care costs. *Staphylococcus aureus* is one of the major nosocomial pathogens responsible for wide spectrum of infection and has led to the treatment drawbacks towards large number of drugs as it is antibiotic resistant. *Serratia marcescence* is a non pathogenic, innocuous organism causing nosocomial infections. It grows in the presence and absence of oxygen at 30–37 °C. It causes hospital acquired infections such as urinary tract infection, pneumonia, eye infections.

Conclusions: Titanium dioxide nanoparticles exhibited antibacterial activity by forming zone of inhibition around the discs. Chitosan can be easily processed into membranes, gels, nanofibres, beads, nanoparticles, scaffolds, and sponge forms that can be used in wound healing applications. Chitosan and titanium dioxide was fabricated and a thin film was formed by air drying.

MCP-02

Microwave Assisted Synthesis of Pyrazolines Bearing Isonicotinyl Hydrazides as Antitubercular, Anticancer and Antioxidant Agents

Jainey Puthenveetil James*[1], Ishwar Bhat[1], Mumtaz Mohammed Hussain[2], Nisha Rose Thomas[3],

[1]Department of Pharmaceutical Chemistry, NGSM Institute of Pharmaceutical Sciences, Mangalore, India

[2]Department of Pharmaceutical Chemistry, SJM College of Pharmacy, Chitradurga, India

[3]Department of Pharmaceutical Chemistry, Sridevi College of Pharmacy, Mangalore, India

jaineyjames@gmail.com

Introduction: Nitrogen containing heterocyclic compounds plays an important role in medicinal chemistry. Among them, five-membered ring pyrazolines have found to possess many biological and pharmacological activities like anticancer, antitubercular, antimicrobial, anti-inflammatory etc. Chalcones are found to be the suitable intermediate for the synthesis of pyraolines, as they exhibit interesting pharmacological activities.

Methods: Chalcones were synthesized from substituted aldehydes by condensing with various substituted acetophenones in ethanol and cyclized into pyrazolines using isonicotinyl hydrazides by conventional and microwave oven synthesis. Anticancer activity studies were carried by tryphan blue exclusion method using Ehrlich Ascites Carcinoma cell lines. Screening of antitubercular activity was by Alamar Blue Dye Method against strains of *Mycobacterium tuberculosis*. Antioxidant activity studies were done by DPPH and nitric oxide method.

Results: Pyrazolines were synthesized from chalcones. Microwave irradiated synthesis of chalcone was carried out to get higher yield with less reaction time period as compared to conventional method. The synthesized pyrazolines produces yield around 68% (conventional) and 85% (microwave). *In-vitro* anticancer studies for the synthesized pyrazolines revealed that some compounds induced the greatest effect on EAC cells. Among the compounds tested for antitubercular and antioxidant studies, some showed promising activity.

Conclusions: The above results proved that pyrazolines are found to be interesting lead molecules for further synthesis as anticancer, antitubercular and antioxidant agents.

MCP-03

Evaluation of Ethanolic Extract of *Aristolochia bracteolata* and its Synthesized Silver Nanoparticles for their Antibacterial Efficacy

Premkumar Thamilarasu, Dhivya P. Sundaram, Prabu Chakkarapani, Latha Subbiah*, Selvamani Palanisamy

Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University,

Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
lathasuba2010@gmail.com

Introduction: The leaves of *Aristolochia bracteolate* were subjected to successive extraction using the ethanol as a solvent. The prepared extract was then subjected to preliminary phytochemical analysis. In this study, I reported the green synthesis of the silver nanoparticle using *Aristolochia bracteolate* leaf broth treated with 1 mM silver nitrate aqueous solution at room temperature while stirring.

Methods: Metallic nanoparticles are traditionally synthesized by wet chemical synthesis. The synthesized AgNPs were characterized using UV–visible absorption spectroscopy, FT-IR Analysis, PSA and zeta potential analysis. Ethanolic extract of *Aristolochia bracteolate* and its green synthesized silver nanoparticles were evaluated against both Gram +ve, Gram –ve bacterial strains for their anti-bacterial efficacy.

Results: FT-IR spectrumdata reveals that the reduction of Ag ions to AgNPs. Prepared nanoparticles were in size range of 340.1 nm and zeta potential −9.38. Anti bacterial assay shows that the synthesized particles have anti bacterial activity.

Conclusions: Results showed that the synthesized AgNPs had highest antibacterial activity against *E. coli* (10 mm), *Pseudomonas* sp. (9 mm), *Shigella* sp. (9 mm) and *Salmonella* sp. (8 mm) than the ethanolic extract of *Aristolochia bracteolate.*

MCP-04

Design, Synthesis, Characterization and Biological Evaluation of Tetrazole Derivatives with Copper Ion

M. Shankar*, L. Prem Kumar, Harathi Panigrahi, B. Ashok Kumar, M. Niranjan Babu
Department of Pharmaceutical Chemistry, Seven Hills College of Pharmacy, Tirupati, Andhra Pradesh, India
shankarmanichellappa@gmail.com

Introduction: Heterocyclic compounds play an important role in biological processes; the scientists are trying to understand the chemistry of heterocyclic compounds in order to improve the quality of human life. Structural study of many of these compounds due to limited synthetic methods is difficult. However, using chemical calculations, assessments of sustainability and magnetic properties of many known or unknown heterocyclic compounds would be possible. Tetrazoles are a class of synthetic organic heterocyclic compound, consisting of a 5-member ring of four nitrogen and one carbon atom with molecular formula.

Methods: Aldehyde (1 g, 1 mol) and aniline (1.023 g, 1.1 mol) were stirred at 5 °C. Tri methyl silyl cyanide (0.981 gm, 1 mol) was added to the above mixture at room temperature. The progress of the reaction was monitored by TLC. After completion, the reaction mixture was extracted with 10 ml ethyl acetate. The organic layer was washed with brain solution. The organic layer was separated and dried over anhydrous sodium sulfate, and concentrated to give crude solid α-amino nitriles. The crude product was recrystallized from ethylacetate. The α-amino nitrile (0.5 g, 1 mol) was refluxed with zinc bromide (0.54 g, 1.1 mol), Sodium azide (0.150 g, 1 mol) and 5 ml water for 2–3 h at 80 °C. The progress of the reaction was monitored by TLC. After completion, the reaction mixture was cooled and treated with 2 ml HCl, 10 ml ethyl acetate and then with brain solution. The resultant organic layer was separated and dried over anhydrous sodium sulfate, and concentrated to give the crude tetrazole. The crude product was recrystallized from ethylacetate.

Results: The α-amino nitrile obtained in the step 1 was used for the synthesis of tetrazole derivatives. The tetrazole derivatives were complexed with cupric chloride gives crude tetrazole copper complex, the formation of alpha amino nitrile was confirmed by IR spectroscopy. The alpha amino nitrile showed peak at 2237 cm^{-1} confirming its formation. The formation of tetrazole showed peak at 2121, 1613 and absence of nitrile peak at 2237 cm^{-1}.The target molecule showed peaks at 2925, 2853 cm^{-1}. The compound I shows more zone of inhibition against *Staphylococcus aureus* at the concentration of 10 μg/ml and 100 μg/ml (21.3 ± 0.08, 24.0 ± 1.08). The compound II shows more zone of inhibition against *Pseudomonas aeruginosa* at the concentration of 10 μg/ml and 100 μg/ml (20.0 ± 0.06, 24.4 ± 1.00) and the compound III shows more zone of inhibition against *Escherichia coli* at the concentration of 10 μg/ml and 100 μg/ml (19.0 ± 0.22, 23.4 ± 1.00) respectively. Thus the result shows that the synthesized all copper tetrazole derivatives showing moderate to good antibacterial activities against both Gram +ve and Gram −ve bacteria.

Conclusions: A series of 3 compounds belonging to tetrazole series were synthesized and characterized. The synthesized copper tetrazole derivatives were subjected to antibacterial activity and it shows promising antibacterial activity.

MCP-05

Green Synthesis and Antibacterial Activity of Silver Nanoparticle Using *Cressa cretica* Plant Extract

Vijayalakshmi Maruthamuthu*, Akilandeswari Krishnan, Gokila Subramanian, Vinothkumar Ramu, Ruckmani Kandasamy
Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India
vijiaut@gmail.com

Introduction: *Cressa cretica* is a small useful herb for treating asthma, bronchitis, dyspepsia, flatulence, colic, anorexia, anaemia, diabetes and skin disease. The biosynthesis of nanoparticles has been proposed as a cost effective and environmental friendly alternative to chemical and physical methods. Plant mediated synthesis of nanoparticles is a green chemistry approach that interconnects nanotechnology and plant biotechnology. In the present study, synthesis of silver nanoparticles (AgNPs) or (Green-Silver) has been demonstrated using aqueous extract of *Cressa cretica* reducing aqueous silver nitrate and evaluate its antibacterial activity.

Methods: Different concentrations of plant extract were used to standardize the optimum concentration of silver nitrate for synthesis of silver nanoparticles. The concentrations ranged from 100 to 500 μl of silver nitrate. Aqueous solution (1 mM) of silver nitrate ($AgNO_3$) was prepared in 250 mL Erlenmeyer flasks and plant extract was added for reduction into Ag^+ ions.The synthesized AgNPs were characterized by ultraviolet–visible (UV–vis) Spectrometer, Fourier Transform Infrared Spectroscopy (FT-IR). The particle size and charge of the particle was analysed by particle size analyzer, Zeta potential analyzer. The antibacterial activity of colloidal AgNPs was evaluated against Gram +ve and Gram –ve such as *Bacillus subtilis* and *Escherichia coli* (*E. coli*) using disc diffusion method.

Results: The synthesized AgNPs of UV-spectrum showed prominent peak at 426 nm. The particle size and charge of the particle was analysed by particle size analyzer, zeta potential analyzer, which indicate negatively charged spherical particles of around 106 nm. The observed zone of inhibition was 20 mm and 18 mm against Gram +ve and Gram −ve bacteria respectively.

Conclusions: The green synthesized silver nanoparticle (AgNPs) of *Cressa cretica* plant extract showed significant antibacterial activity against *Escherichia coli* (*E. coli*) and *Bacillus* sp. in comparison to both $AgNO_3$ and raw plant extracts. Moreover, the AgNPs prepared are safe to be discharged in the environment and

possibly utilized as effective antibacterial agent as shown by our study.

MCP-06

Synthesis and Characterization of ZnS Quantum dot using Aspergillus *sp.*

Vineeth Chembappilly Arumughan[1], Tincy Kunnathu Thomas[2], Ananthakrishnan Jayakumaran Nair*[2],

[1]Centre for Nanoscience and Nanotechnology, University of Kerala, Thiruvananthapuram, Kerala, India

[2]Department of Biotechnology, University of Kerala, Thiruvananthapuram, Kerala, India

jekksnair@gmail.com, ajayakumarannair@gmail.com

Introduction: Quantum dots are nanosized crystals with a size range of 2–10 nm, Because of their reduced size, QDs behave differently from bulk solids due to the quantum-confinement effects that are responsible for their remarkably attractive properties. These properties enables them for many applications like the production of photoconductors, field effect transistors, solar cells, sensors, transducers, optical coating and light emitting materials and also can be used in biological applications such as imaging of organs, imaging of tissues (both *in-vivo* and *in-vitro*), detecting tumors, drug delivery and drug screening applications as they can function as fluorescent tags. This study deals with synthesis of ZnS QDs using fungus and its characterization.

Methods: The synthesis of ZnS Quantum dots were done by reduction of $ZnSO_4$ using the supernatant obtained from the fungus. Nanoparticles so formed were then subjected to characterization techniques such as UV–visible Spectroscopy, XRD, SEM, FTIR and Spectrofluorimetry.

Results: UV–visible absorption spectra are used to find the optical band gap and the value obtained was found to be 4.88 eV and it also shows that the absorption peaks exhibit blue shift as compared to the bulk. The particle size of nanoparticles calculated from XRD pattern was found to be 5 nm. The Powder XRD analysis of ZnS nanoparticles showed strong reflections exhibiting two major sharp peaks at 2θ values of 39° and 60° indexed as (2 1 1) and (2 1 5). The discrepancies in the 2θ values may be attributed to the surface irregularities of the nanocrystals. SEM image of the nanoparticles showed the clusters of nucleated NPs. FTIR study is carried out to identify the capping of the particles by biological compounds. While the Photoluminescence spectra of ZnS nanoparticles at excitation wavelengths of 280 nm showed quantum confinement effects. The emission spectrum recorded between 300 and 700 nm at excitation at 280 nm showed maxima at 600 nm.

Conclusions: The study introduced a new technique of synthesis of nanoparticles using *Aspergillus sp.* Synthesized nanoparticles were of very small size (5 nm) and have exhibited unique properties of quantum dot. The characterization studies revealed the features of biologically synthesized ZnS quantum dots – structural, morphological and surface characters as well as optical and electrical features.

MCP-07

Survival of Efficient Plant Growth Promoting Rhizobacteria (PGPR) Cells to Improve the Longer Shelf Life in Different Carrier Materials

Aniskumar Mani[1], Sakthivel Uliyan[2], Latha Subbiah[3], Selvamani Palanisamy*[3]

[1]Department of Biotechnology, Pavendar Bharathidasan College of Engineering and Technology (Affiliated to Anna University Chennai), Tiruchirappalli, Tamil Nadu, India

[2]Department of Microbiology, Annamalai University, Annamalai Nagar, Tamil Nadu, India

[3]Department of Pharmaceutical Technology & Centre for Excellence in Nanobio Translational Research, Anna University, Bharathidasan Institute of Technology Campus, Tiruchirappalli, Tamil Nadu, India

pselvamani@hotmail.com

Introduction: Plant growth in agricultural soils is influenced by many abiotic and biotic factors. There is a thin layer of soil immediately surrounding plant roots that is an extremely important and active area for root activity and metabolism which is known as rhizosphere, Bacteria associated with plants can be either harmful or beneficial. PGPR may promote growth directly, by fixation of atmospheric nitrogen, solubilization of minerals such as phosphorus, production of siderophores that solublize and sequester iron, or production of plant growth regulators, phytohormones. The development of suitable formulation, which would ensure survival and protection of the strain and the application technology, Lignite is the preferred and widely used carrier in most of the bio fertilizer manufacturing plants all over India In this present study, the PGPR isolates was investigated by using different carrier materials for the improvement of longer shelf life.

Methods: The plant growth promoting rhizobacteria (PGPR) isolates were isolated from the rhizosphere soil of *Andrographis paniculata*, investigated by using different carrier materials. The carrier based PGPR consortium with four selected efficient strains *viz., Aospirillum lipoferum* APAzs-7, *Azotobacter chroococcum* APAzt-13, *Pseudomonas fluorescens* APPf-5 and *Bacillus megaterium* APPb-13 was prepared and the shelf life and storage temperature for each inoculants was studied upto six months of storage.

Results: The surviving population was recorded in the lignite based consortium (14.66×10^8 cfu g^{-1}) for *Azospirillum lipoferum* APAzs-7, (12.00×10^8 cfu g^{-1}) for *Azotobacter chroococcum* APAzt-13, (13.44×10^8 cfu g^{-1}) for *Pseudomonas fluorescens* APPf-5 and (12.44×10^8 cfu g^{-1}) for *Bacillus megaterium* APPb-13 after six month of storage followed by vermiculite and talc by individual and dual inoculants. In storage temperature, the surviving population was recorded in the lignite based consortium (37.44×10^8 cfu g^{-1}) for *Azospirillum lipoferum* APAzs-7, (34.33×10^8 cfu g^{-1}) for *Azotobacter chroococcum* APAzt-13, (39.44×10^8 cfu g^{-1}) for *Pseudomonas fluorescens* APPf-5 and (36.44×10^8 cfu g^{-1}) for *Bacillus megaterium* APPb-13 after 40 °C in one month of storage followed by vermiculite and talc by individual and dual inoculants. Overall this study revealed that the highest survival population recorded in lignite based consortium of efficient PGPR cells was better than vermiculite and talc powder.

Conclusions: A better understanding of different carrier materials used in PGPR survival and their shelf life of the interrelationships in the soil–plant–microorganisms system is needed to improve the efficacy of PGPR inoculum application in the field. In this present study concluded that lignite based PGPR consortium will be gave the better survival of root system and improve the growth and yield of medicinal plants and other crops.

MCP-08

Production and Optimization of xylanase by *Penicillium sclerotiorum* and *Aspergillus niger*

Jayabarath Jayaraman*, Fatima Shabanu Shanawaz Khan, Vaishnavee Sivakumar

Department of Biotechnology, Pavendarbharathidasan College of Engineering & Technology, Mathur, Tiruchirappalli, Tamil Nadu, India

barath_bio@yahoo.co.in

Introduction: Enzymes are distinct biological polymers that catalyze the chemical reactions and convert substrates to particular products. They are specific in function and speed up reactions by providing alternative pathways of lower activation energy

without being consumed. Xylanase is an extracellular enzyme which hydrolyses β-1,4 D-xylosidic linkages of highly polymerized and substituted β-1,4 linked D-xylobiose, xylotriose and glucuconosyl residues. Xylanases are genetically single chain glycoproteins, ranging from 6 to 80 kDa, active between pH 4.5 and 6.5, at 40–60 °C. Xylanases from different sources differ in their requirements for temperature, pH etc. for optimum functioning.

Methods: Organisms and their sporulation growth: *Aspergillus niger* culture was cultivated on the potato dextrose agar as the spores were to be stored for longer period for the utilization of organism in different trials. The sporulation medium for *A. niger* was prepared at pH 6.0 was maintained at 37 °C with 1 M HCl and 1 M NaOH. The prepared medium was autoclaved at 121 °C for 15 min under 1.1 kg/cm^2 pressure.

Enzyme production: Xylanase enzyme production was carried out on CzapekDox broth at 25 °C for 7 days. Liquid cultures were prepared in the same medium containing 1% (w/v) of the carbon source mentioned and the pH was adjusted for each experiment. Erlenmeyer flasks containing 25 ml of medium were inoculated with 1.0 ml of spore suspension and incubated at different conditions as indicated subsequently.

Results: Production of xylanase on wheat bran enzyme activity for *P.* sclerotiorum and *A. niger* respectively on various concentrations of wheat bran. Xylanase was synthesized on various concentrations of wheat bran (2.5%, 3.0% and 3.5%) using four different pH levels (4.0, 5.0 and 6.0) and four incubation temperatures (25.0, 27.5, 30.0 and 32.5 °C) over a period of 168 h for *Penicillium sclerotiorum* and 96 h for *Aspergillus niger.*

Production of xylanase on sugarcane bagasse: During the study, third carbon source i.e. sugar cane bagasse was also evaluated for the production of xylanaseat various concentrations (2.5%, 3.0% and 3.5%), different pH levels (5.0, 5.5, 6.0, and 6.5) and at four different incubation temperatures (25, 27.5, 30 and 32.5 °C) over a period of seven days for *P. sclerotiorum* and four days.

Conclusions: The effect of different pH levels on the enzyme production is elaborated and when these organisms was grown on wheat bran, corn cobs and sugar cane bagasse. It is obvious that at the pH 6.5 of the culture medium, fungus *P. sclerotiorum* showed highest activities of the xylanase for all carbon sources. *A. niger* showed maximum xylanase activity at pH 5.5. Hence, pH 5.5 was noted to be the most suitable to produce maximum enzyme activity when a before mentioned substrates were used as carbon source.w

MCP-09

A Study on Scaffolding Similarities and Docking Studies of Proanthocyanidins Extracted from *Vitis vinifera* against Dental Caries

Shanmuga Priya Jeyakumar[1], Devika Rengasamy*[2]
[1]Sathyabama University, Chennai, Tamil Nadu, India
[2]Department of Biotechnology, Aarupadai Veedu Institute of Technology, Paiyanoor, Kancheepuram, Tamil Nadu, India
stannis22@gmail.com

Introduction: *Vitis vinifera* (Common grape) is common and native of Mediterranean region, Central Europe and Southwestern Asia. Currently, there are 5000–10,000 varieties of species under the genus *Vitis* which have commercial and medicinal significance. *V. vinifera* contains many phenolic compounds (anthocyanins, hydroxycinnamic acid, tannins) in the skin, pulp and seeds are rich of proanthocyanidins. Proanthocyanidin represent a group of condensed flavan-3-ols (procyandins, predelphinidins, propetargonidins) and have significant therapeutic valve in the traditional medicine.The taste sweetness is strongly linked to food intake in humans and in addition inextricably leads to the development of dental caries. Among the sweeteners, the sucrose is the most common and highly consumed form of sugar which causes tooth decay. Further a high molecular-weight sticky glucan plays an essential role in the pathogenesis of *Streptococcus mutans*. The glucansucrases is the main extracellular enzyme produced by *S. mutans* involved in conversion of sucrose to glucan. Thus screening of novel agents with inhibitory potential over the activity of glucansucrases could overcome the problem of dental problems associated with bacterial biofilm formation.

Methods: In the present study we used the computational approach to find the ability of proanthocyanidin to inhibit the activity of glucansucrases. The chemical structure of ligand (proanthocyanidin) as retrieved from Pubchem compound database (http://www.ncbi.nlm.nih.gov/search). The retrieved ligand structures in.sdf format were converted to.pdb format using Pymol. Further the crystal structure of glucansucrase from the Dental Caries Pathogen, *Streptococcus mutans* was retrived from RCSB database. The docking analysis was carried out using Auto dock tools (ADT) (Sanner, 1999) v1.5.4 and Autodock v4.2 programs. The results obtained was viewed and analysed with Pymol tool.

Results: Earlier report clearly denoted the importance of ASP 593 in make insoluble and sticky glucan with α(1–3) glycosidic linkages. Our study revealed the binding potency of proanthocyanidin to the Glucansucrase of *Streptococcus mutans.*

Conclusions: This study suggests that the affinity of proanthocyanidin towards the ASP 593 supports the glucansucrase inhibitory potential of proanthocyanidin. Thus the proanthocyanidin could be a potential compound for prevention of bacterial biofilm and further development of dental carries.