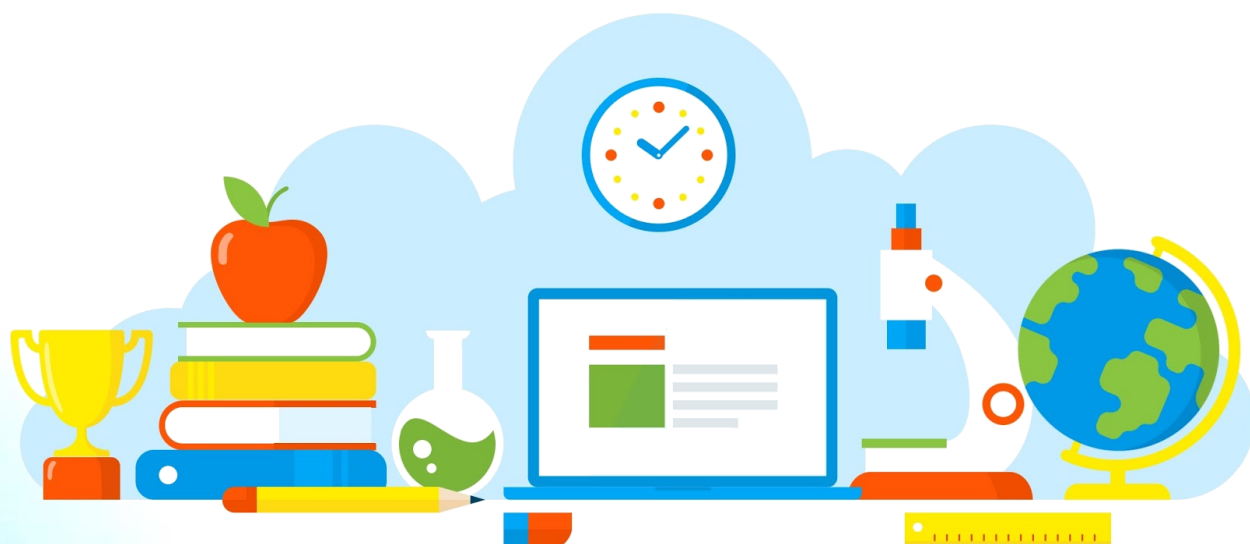


BioTrendz



*National Conference on
“Biotech and Pharma Applications”
(NCBA 2020)
12 March 2020*



Souvenir

*Department of Biotechnology
K L University
Greenfields, Vaddeswaram, Guntur District, Andhra Pradesh-522 502*

National Conference on
“Biotech and Pharma Applications (NCBA)”
12 March, 2020



Organized by
Department of Biotechnology
K L University
Greenfields, Vaddeswaram, Guntur District, Andhra Pradesh-522 502

About Department of Biotechnology, K L University

The Department of Biotechnology at K L University was established in the year 2002-03 with an aim to provide scientific and technical solutions to mankind. Biotechnology is a congregation of science and technology which embeds basic principles of Physics, Mathematics, Chemistry and Biology. The Department went for accreditation by NBA of AICTE for the first time in 2007, and was accredited for three years. The department also attracts foreign students from Middle east, African countries, Nepal and Bhutan.

The Department offers a four year undergraduate engineering degree in Biotechnology with specializations in Biomedical Engineering, Bioinformatics, Biofuels and Genetic Engineering. The department offers a post graduate course in Biotechnology, which is embedded a one year project in an industry/research organization. The Department offers PhD programs in vivid specializations on a full time and part time basis.

The strength of the department is its very rich treasure of faculty who were drawn from reputed National and International Academic and research organizations. Faculty with good industrial experience and exposure are also a part of our team at the Department of Biotechnology. Faculty with post doctoral research experience and faculty with more than 15 years of experience are feathers in the cap of our department.

The faculty of the department is extensively involved in quality Research and Development. The Department over the last three years has acquired projects worth more than 3 crores in the areas of Biofuels, Biomedical research, Genomics, Proteomics, Bioinformatics and food biotechnology in vivid fields of biotechnology funded by prestigious research organizations like DBT, DST, UGC and ICMR. The department also has a couple of women scientists working under DST funded projects. The Department has filed patents with IPO in collaboration with industry and a few from sponsored projects.

The Department has 7 well furnished and fully equipped state of the art laboratories along with 4 research centres. The department also has its own computer center with latest molecular modelling and drug design software purchased from Schrodinger LLC, USA.

As a part of student centric learning various measures and initiatives are taken to improve the skills of students. These include exposure to guest lectures, industrial training and tours, communication and soft skills, Mini Projects, paper presentations in national level paper contests, class room seminars, placement opportunities, academic and career counseling, certificate courses, live projects in industry, exposure to journals and so on.

Another area of concentration for the faculty is Research consultancy. The department has signed MoU's with Sneha Biotech, Vijayawada and NRI academy of medical sciences, Guntur for faculty and student training and collaborative research. The department of Biotechnology is collaborating with Indian Institute of Science, Bengaluru and University of Oxford, UK for initiating collaborative research in Biomedical Sciences.

ORGANIZING TEAM

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Dr.K. Giridhar
Head of the Department, KLU

Secretary
Dr.V. Praveen Kumar
Alternate Head, KLU

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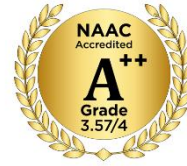
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Dr.G. Siva Reddy, Assistant Professor, KLU

Coordinators

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Ms.Y N Lakshmi, Lab Manager
Ms.G Swathi, Lab Manager
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Mrs. Nagamani, Office Assistant



Er.Koneru Sathyanarayana
President, K L E F



Message

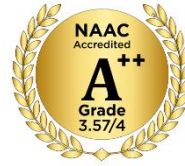
Warm and Happy greetings to all.

I am immensely happy that Department of Biotechnology of our K L University is organizing a **National Conference on Biotech and Pharma Applications (NCBA-2020)** during 12 March, 2020 and is going to discuss on a collection of technical papers in the proceedings.

Department of Biotechnology, K L University continues to march on the way of success with confidence. On this occasion, I wish all the very best.

I congratulate HOD, staff members, students of Department of Biotechnology, Delegates and Participants from different parts of the country and nations for their efforts in participating in this conference and wish the conference all the success.

K. Sathyanarayana



Sri Koneru Raja Hareen
Vice-President



Message

I am glad to learn that Department of Biotechnology, K L University in collaboration with Association of Biotechnology and Pharmacy is organizing a **National Conference on Biotech and Pharma Applications (NCBA-2020)** during 12 March, 2020.

It is heartening to know that the national Conference-**NCBA-2020** is being organized with the objectives to strengthen the current national and international scenario of Biopharmaceuticals; scaling up from research to production and their usage; thereby prevention and protection from many deadly diseases/ disorders.

I wish the conference all success.

K. Raja Hareen

Dr.L.S.S.Reddy
Vice-Chancellor



Message

I am delighted to know that the Department of Biotechnology of our K L University in collaboration with Association of Biotechnology and Pharmacy is organizing a **National Conference on Biotech and Pharma Applications (NCBA-2020)** during 12 March, 2020. It gives me an immense pleasure that a souvenir is also being brought out.

I am sure that it will provide a platform to discuss the research in Biotechnology happening throughout the world. I hope that the participants from all over the country and abroad would interact on the subject for upgrading their knowledge and skills to enhance their utility to the Biotechnology sector.

My best wishes for the success of the conference.

L.S.S. Reddy

Dr.K. Giridhar
Head, Department of Biotechnology
Organizing Secretary, NCBA-2020



Message

I, on behalf of the Faculty of Biotechnology feel proud in organizing a **National Conference on Biotech and Pharma Applications (NCBA-2020)** during 12 March, 2020. During the conference, participation of people from different disciplines is expected to take place on common platform and hence there would be sharing of views with eminent speakers from all over the world wherein exchange of their knowledge and skills in Biotechnology will happen. This conference will help the students, researchers and academicians to interact with professionals.

I hope the conference a grand success.

K. Giridhar

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PROBIOTICS AS LIVE NUTRACEUTICALS: EXPLORING NATURE'S GIFT FOR HEALTH CARE PRODUCTS

Gummavajjala Mahathi¹, MeesalaMahaLakshmi¹ and Suresh Chandra Phulara¹

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ABSTRACT:

Probiotics are the live nutraceuticals utilized for human wellbeing. By and large, the human gastrointestinal tract comprises of microbial greenery which helps in absorption for human utilization. The utilization of probiotics causes medical advantages to the shopper with no symptoms under ideal conditions. They improve the safe framework for barrier, gastrointestinal tract wellbeing, stifle the lactose prejudice indications, lessen serum cholesterol levels, etc. The matured nourishment is the primary wellspring of probiotics, which is by and large devoured as an eating routine by us. Another significant fixing in the aged nourishment is probiotics, which is the primary consumable hotspot for probiotics. Nourishment fixings or dietary enhancements can be done by consolidating probiotics and prebiotics in a type of synergism. These are named as synbiotics. The endurance of probiotic life forms in the gut relies upon their having colonization factors which empower them to oppose the antibacterial systems (synthetic and physical) which work in the gut.

Index Terms – Probiotics, Prebiotics, Synergism, Synbiotics, Nutraceuticals, microbial flora.

ISOLATION AND CHARACTERIZATION OF DYE DECOLORING ENDOPHYTIC BACTERIA FROM DIFFERENT FRUIT SOURCES

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ABSTRACT:

Nowadays our country is facing many problems regarding pollution, one of them is water pollution, which is showing disastrous effects to our nation. One of the major reasons for water pollution is the release of “synthetic dyes” into the water bodies from textile industries. To solve this problem endophytes are most suitable microorganisms to be used in the dye decolorization process. Our main objective is to produce suitable endophytic bacteria from easily available sources such as fruits. Endophytes have the potential to sustain in phenolic compounds, secondary metabolites, fruit flavonoids and also pigments in different fruits. Therefore they might have the ability to degrade the dye concentration in any dye contaminated solution such as in industrial effluents, chemical industrial waste water etc. Endophytes were isolated from different fruit samples (kiwi, plum, banana) and characterized further using biochemical assays. The dye decoloration was performed using bromophelol blue and sudan black dye. The endophytes from kiwi and plum significantly reduced the dye concentrations. To the best of our knowledge, this is the first report on dye decolorization using endophytic bacterial isolates from fruit sources. This method might be scaled up at industrial level because all the raw materials and chemicals are affordable, easily accessible and most of these the bacteria are non-pathogenic in nature.

Index Terms – Endophytes; bacteria; fruits; dye colorization; water pollution

MICROBIAL FUEL CELL: BIOTECHNOLOGY OF ENERGY GENERATION FROM MICROBIAL CELL FACTORIES

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ABSTRACT:

Fossil fuels and carbon origin sources are the main factors affecting our environment. Hence, alternative energy source has to be established to feasible energy along with fossil fuels and carbon origin resources till it is the right time to alter them. Microbial Fuel Cell (MFC) is an emerging technology in the field of energy production. In contrast with the conventional power sources, it has better efficacy and not at all controlled by Carnot cycle. Its high efficiency, low sound, and very low pollutant output can be made it reorganize in the power production industry with a transfer from centrally located generating stations and longdistance transmission lines to distribute power generation at load sites. In this review, several features of the MFC technology will be presented. First, a brief history on microbial fuel cells is highlighted; second, the focus is then changed to elements responsible for the construction of MFC working with. Next a brief on working principle and after that the types of based on their structures and mechanism.

Index Terms – Energy; microbial fuel cell; biofuel; microorganisms

BIOCHEMICAL AND MOLECULAR CHARACTERIZATION OF SNAKE VENOM METALLOPROTEINASES FROM COBRA VENOMS

P Kundan kumar and Chandrasekhar Chanda

Department of Biotechnology, Koneru Lakshmaiah Education Foundation,

Green Fields, Vaddeswaram, A.P., India-522502.

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ABSTRACT:

Snakes are the most worshipped, most feared, most hated and most loved animals on earth. The respect they receive is mostly due to their mystic lifestyles and their VENOMS. In ancient Egypt, snakes were considered to be the greatest healers. Therefore, the snake entangled mast –THE CADUCEUS is the modern symbol of healing. This research group simply tries to test whether the snakes can still be considered as great healers. We try to find out potent therapeutic factors from snake venoms. The first project described here is an attempt to find ant clotting factors from the most common venomous snake in India----The Monocled Cobra (*Naja Kaouthia*) and Spectacled Cobra (*Naja Naja*)

Index Terms – Snake venom, anticoagulants, Metalloproteinase, Disinterring

COST EFFECTIVE PRODUCTION OF FUNGAL GLUCOSE OXIDASE USING PALM JAGGERY

**Uppalapati pavankalyan, Annavarapu Yasaswi, Atchukola Teja, Giridhar
Kanuri, Chandrasekhar Chanda**

Department of Biotechnology, Koneru Lakshmaiah Education Foundation,
Green Fields, Vaddeswaram, A.P., India-522502.chandrasekharchanda02@@kluniversity.in.

ABSTRACT:

Glucose oxidase (GOx) belongs to oxido-reductase class of enzyme produced by few fungal strains and insects. Glucose oxidase has several applications in food, pharmaceutical and biotechnological industries. Glucose oxidase is widely used in diagnostics and biosensors in determining glucose levels. Current study focussed on cost effective production, purification and characterization of glucose oxidase isolated from fungal strain *Aspergillus niger* grown on palm jaggery. Extracellular fungal proteins were fractionated using cation exchange column chromatography and purified glucose oxidase activity was tested with modified benzoquinone activity assay. Approximately 560 IU/ml of glucose oxidase activity was observed using 1% palm jaggery as primary carbon source in submerged fermentation.

Index Terms – Aspergillus niger. Benzoquinone assay, Column chromatography, CM Sephadex, Glucose oxidase, Media optimization, Palm Jaggery

OPTIMIZATION OF XYLANASE PRODUCTION FROM PENICILLIUM FUNICULOSUM USING AGRICULTURAL (CORN COB) WASTE

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ABSTRACT:

Xylanases are the recent breakthroughs in food, feed and pharma industries. Extensive research on xylanases will be beneficial to minimize the economy and high yield to the increased demands of humankind. Xylanases reduce plant cell structural polysaccharide called xylan to its subsequent sugar, xylose. Current study focussed on the production and purification of xylanases from a fungal strain *penicillium funiculosum* taking agricultural waste i.e., corn cob powder as the major carbon source through solid state fermentation. Cation exchanger chromatography (CM Sephadex C-50) was used for fractionation of proteins and purification of xylanases. Approximately 668 Units of xylanase enzyme per gram of Corn Cob powder was produced in solid state fermentation.

Index Terms – *Penicillium funiculosum, xylanase, xylan, corn cob powder, column chromatography.*

LIGAND BASED PHARMACOPHORE SCREENING, DOCKING AND SIMULATION STUDIES OF NATURAL MOLECULES AS POTENTIAL INHIBITORS OF PTP1B

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ABSTRACT:

Protein tyrosine phosphatase 1B (PTP1B) belonging to tyrosine phosphatase family is highlighted as a negative regulator of leptin and insulin resistance pathways. Inhibition of PTP1B enzyme activity as a therapeutic target directs towards development of new drugs for obesity and diabetes treatment. The present study deals with screening of PTP1B inhibitors from the in-house natural molecules database using computational approaches like e-pharmacophore and filters viz ADME and PAINS. Continuing, the screened hits docking studies with the PTP1B catalytic site and their binding affinities were analyzed. The hits possessing G-score > -6 were cross validated against TCPTP target to specify the molecules interaction profiles between the two targets along with their binding free energies. Depending on the three criteria's; H-bond interaction, G-score and binding free energy calculations, three molecules KLEF-10555, KLEF-10649 and KLEF-04175 were identified as potential hits specific to PTP1B target. Based on these observations, the molecule KLEF-04175 was reported as novel PTP1B inhibitor and needs to be further validated through experimental studies.

Index Terms – PTP1B, TCPTP, e-Pharmacophore modeling, Docking studies, Molecular simulation studies.

ENCAPSULATION EFFICIENCY AND PHYSICOCHEMICAL STABILITY OF OMEGA 3 FATTY ACID NANOEMULSIONS PRODUCED BY LOW ENERGY METHOD: BIOACCESSIBILITY OF EPA AND DHA MEASURED USING GAS CHROMATOGRAPHY

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ABSTRACT:

In the present study, omega-3 fatty acids are encapsulated in the form of nanoemulsions for improved bioavailability using the low energy method. Among seven cooking oils tested, sunflower oil produced stable nanoemulsions and passed through physical stress conditions. Surfactant mix, Omega 3 fatty acids (EPA+DHA) are incorporated into the oil phase and emulsions were prepared by low energy method and their physicochemical properties have been studied upon storage at 4°C, 25°C and 40°C up to 28 days. Nanoemulsions droplet size was observed to be within the range of 100-200nm, zeta potential (ζ) above -30mV with polydispersity index less than 0.5 after storing for more than 28 days at 4°C, 25°C and 14 days at 40°C. Further, addition of cholecalciferol (vitamin D) enhanced the emulsion stability upto 20 days at 40°C and also improved oxidative stability. The stability of DHA and EPA has been observed to be 87% and 86% at 4°C, 25°C respectively at the end of four weeks and 51% at 40°C after three weeks storage. Bioaccessibility studies using gastrointestinal simulation model showed high availability compared to plain oils with added DHA & EPA. These nanoemulsions can be of use for supportive therapies and food-based approaches to improve omega 3 fatty acid nutrition. This is first of its kind which fabricated an efficient nano-vehicle with cooking oils using low energy method for the delivery of omega 3 fattyacids.

Index Terms – Fatty acids, cooking oils, nanoemulsions, cholecalciferol, GIT simulation, bioaccessibility

EFFECT OF VARIOUS DETERGENTS ON ANTIGEN-ANTIBODY INTERACTIONS

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ABSTRACT:

Binding interaction between antigen and a receptor molecule on one or more vertebrate cell types, antibodies are the major soluble effector molecules produced. Previous studies on the interaction of antigen and antibody using detergents found that nonspecific binding of serum proteins to the antibody coatings was a major caused of deterioration in antibody binding capacity. In this study, we used five different detergents to study the epitope and paratope interactions by ELISA method. The ionic and non-ionic detergents with varying concentrations may inhibit the reaction between antigen and antibody. To increase the sensitivity of the reaction, monoclonal antibody towards the specific antigen is employed for increased accuracy. Detergents are primarily selected on the basis of their current use as solubilizing agents such as Sodium Lauryl Sulphate (SLS), Cetyl Trimethyl Ammonium Bromide (CTAB), Dithiothreitol (DTT) and Polysorbate 20 (Tween 20). Based on previous research findings, results are anticipated for use of SDS and DTT with promising results.

Index Terms – Sodium Lauryl Sulphate, Cetyl Trimethyl Ammonium Bromide Dithiothreitol, Polysorbate-20, ELISA.

PHYTOHEMAGGLUTINATION ASSAY OF CAMELLIA SINENSIS AND CAMELLIA ASSAMICA EXTRACTS ON MEMBRANE RECEPTORS OF ERYTHROCYTE SURFACES

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ABSTRACT:

The objective of this study is a comparative analysis of the changes observed on the red blood cell antigens which differ in a short glycoprotein chain difference, by the effects of a *Camellia sinensis* and *Camellia assamica* extracts. The haematological effect of the extract was prepared and evaluated using blood group analysis on haematological indices. Agglutination was clearly observed initially for 5 min for all the eight blood types. Specifically, for the O+ blood group, there is a time lag for agglutination to take place for the incubation period of 15 min for *C. sinensis*, while agglutination occurred after 10 minutes of adding blood group antibodies with *C. assamica*. These results, as well as the possibility of adapting this method to a fully automated system, could be an important contribution to the field of immunohematology.

Index Terms – *Camellia sinensis*, *Camellia assamica*, *Haematological effect*, *Agglutination*, *Blood group analysis*

HIGH-THROUGHPUT SCREENING OF NEW PANCREATIC LIPASE INHIBITORS TARGETED TO OBESITY

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ABSTRACT:

Obesity recognized as a multi-factorial metabolic syndrome is increasing at an alarming rate globally and has become a root cause of various co-morbid disorders including type2 diabetes, cardiovascular diseases, osteoarthritis, gallbladder diseases, gout and some cancers affecting population irrespective of age group. Although there exists several strategies targeted to weight reduction, the widely accepted mechanism includes the pancreatic lipase inhibition. Orlistat, a monopoly anti-obesity drug which functions as a pancreatic lipase (PL) inhibitor is commercially being used in many parts of the world. However, its usage is limited because of its non-negligible side effects such as gastrointestinal discomforts and vitamin absorption deficiency. The current study is aimed at High Throughput Screening (HTS) of the pancreatic lipase inhibitors which could produce no to minimal side effects and to increase the efficacy of the drug. The hit molecules were selected from the natural molecules database using silico protocols based on their docking scores and simulation studies. The identified molecules were further evaluated following the invitro procedures in 3T3-L1 cells.

Index Terms-co-morbid, anti-obesity, PL, HTS, docking.

SCREENING OF 5HT2C INHIBITORS TARGETING SATIETY AND APPETITE CONTROL

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ABSTRACT:

Obesity prevalence continues to be a foremost health concern across the globe leading to the development of major health risk conditions like type II diabetes, hyperlipidemia and hypertension. Because of the deprived drug-based management system, there is an urgent need for the development of new drugs aiming at satiety and appetite control targets. Among the reported satiety signaling targets, 5HT2C receptor plays a crucial role in decreasing appetite and has become a promising target for the development of anti-obesity drugs. Lorcaserin, a 5HT2C receptor agonist and the only drug available in the market, was designed based on the receptor mechanism of action. Due to limited drug options available and considering the adverse drug effects of Lorcaserin, the development of new drugs which are highly specific toward the 5HT2C target and with lesser side effects is essential. The present study is majorly focused on developing new 5HT2C agonists through computational approaches like screening, docking, and simulation using Phase, QikProp, Glide and Desmond applications of the Schrodinger suite. Screening protocols resulted in eight best hit molecules with affinity for the receptor and among them, five hits displayed binding affinity toward the conserved residue Asp 134 of the receptor. Further, due to the high sequence similarity seen among the receptors of 5HT2 family, the three potential hits were cross validated against other subtypes 5HT2A and 5HT2B of the 5HT2 family to determine the specificity of the molecules against the target.

Index Terms- 5HT2C receptor; ZINC natural molecule database; pharmacophore modeling; glide; dynamic simulations

GENOME-WIDE IDENTIFICATION, CHARACTERIZATION AND EXPRESSION ANALYSIS OF NON-RD RECEPTOR LIKE KINASE GENE FAMILY UNDER COLLETOTRICHUM TRUNCATUM STRESS CONDITIONS IN HOT PEPPER

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ABSTRACT:

Receptor like kinases (RLKs) are preserved upstream signaling molecules which regulate several biological processes from plant development to various stress adaptation programs. Non arginine aspartate (non-RD) a prominent class of RLKs plays a significant role in disease resistance and apoptosis in plants. In present investigation, a comprehensive in silico analysis for non-RD Kinase gene family as well as identification of gene structures, sequence similarity, chromosomal localization, gene duplication analysis, promoter analysis, transcript expression profiles and phylogenetic studies were done. In this study, twenty-six genes were observed on nine out of twelve chromosomes. Some of the important physiochemical properties of twenty-six proteins are (a) Amino acids size ranged from (620 to 1781) (b) Molecular weight ranged as of (70.11 to 197.11 KDa) and (c) Theoretical PI ranged from (5.69 to 8.63) respectively. Structural diversity in genomic structure among non-RD kinase gene family was identified and presence of pathogen induced *cis* regulatory elements including STRE, MYC, MYB, and W box were found. Expression profiles revealed the potential ability of three genes CaRLK1 from LRRXII and CaRLK15,16 from stress antifung subfamily were pointedly upregulated beyond the severe stress time period (9 DAI) in anthracnose resistant genotype PBC-80 in response to *Colletotrichum truncatum* infection. Subsequently, in silico studies from the available genome sequencing data helped us to identify candidate genes tangled in inducing disease resistance.

Index Terms – Pattern recognition receptors (PRRs) · Auto phosphorylation · Downstream signaling · Colletotrichum truncatum · Defense responses

DATA ON GERMINATION, GROWTH AND MORPHOLOGICAL CHANGES OF OIL PALM ZYGOTIC EMBRYOS DURING IN VITRO CULTURING

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ABSTRACT:

Oil palm (*Elaeis guineensis* Jacq.) from being almost unknown crop a mere three decades ago is now the most consumed and the most traded edible oil in the world. It is a highest yielding crop producing on an average 4 to 6 tons of oil per ha per year. Due to its innumerable uses in the food, oleochemicals and biofuel industries, cultivation of oil palm has expanded enormously in recent years. Since oil palm is a perennial monocotyledonous species with a single growing apex, the plant cannot be multiplied vegetatively and the conventional propagation through seed is limited by dormancy. Thus in vitro germination has become the key method for multiplication of elite oil palm genotypes. Although there are several reports on in vitro germination of oil palm, still there is a lack of an efficient & repeatable method. Hence an attempt is made to standardize the suitable culture media for direct germination from mature oil palm zygotic embryos. The data presented here represents the effect of genotypes, pretreatments and culture media on Mean Germination Time, Speed of Germination Index, Shoot Formation Index and Root

Index Terms – Oil palm, Zygotic embryo, In vitro culture

ISOLATION AND CHARACTERIZATION OF POTENTIAL CELLULOSEDEGRADING BACTERIA FROM SHEEP RUMEN

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ABSTRACT:

In the present study, cellulose degrading bacteria was isolated from sheep rumen. Screening of cellulose degrading bacteria was carried out based on CMC (carboxyl methyl Cellulose) hydrolytic test which was seen as clear zone around colony as well as whatsmann filter paper degradation test. Twenty bacterial isolates with clearance zone diameter of >10mm on CMC agar were screened out for filter paper degradation test. Out of twenty isolates, only eight were able to digest filter paper and subjected to cellulase enzyme assay, microbiological analysis and molecular characterization. Cellulase enzyme was extracted from each isolate and enzyme activity assay was performed based on 3-5, dinitro- salicylic acid (DNS) method. Enzyme activity ranged from 0.225u/ml to 1.652u/ml in which maximum result was obtained in bacterial isolate labelled as KLCD08. Bacteriological study of the isolates showed that five isolates (KLCD04, KLCD012, KLCD15, KLCD18, KLCD19) belong to *Bacillus species*, two isolates (KLCD01, KLCD09.) *Bacteriodes species* and one isolate (KLCD08) *Enterobacter pecies*. Molecular characterization was applied to the isolate with greater cellulolytic activity (KLCD08) based on 16srRNA gene sequencing. According to phylogenetic analysis made by the use of EZBIOcloud database, theisolate showed 99.84 % homology with *Enterobacter cloacae* subsp. *Dissolvens*. The sequence was deposited to NCBI GenBank with accession number of MN120893. The identified bacteria could be used for large scale production of cellulase enzyme through bio-processing technology. It can also be formulated as probiotics in animal nutrition.

Index Terms – Sheep rumen, Cellulose degrading bacteria, cellulase, CMC, 16srRNA.

CHITOSAN OLIGOSACCHARIDE BASED HYDROGEL: AN INSIGHT INTO THE MECHANICAL, DRUG DELIVERY, AND ANTIMICROBIAL STUDIES

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ABSTRACT:

Hydrogel is a macromolecular polymer gel constructed of a network of cross-linked polymer chains. Chitosan oligosaccharide (CO) is a natural polymer that has an efficient biodegradability and is used to prepare hydrogels for efficient drug delivery. CO is combined with Carboxy Methyl Cellulose (CMC) to produce a hydrogel in different compositions for the best suitable option where the drug delivery and biocompatibility are most efficient. The chemical hydrogels of the composition CO and CMC were prepared by adding the cross-linker mixture of glutaraldehyde, alcohol, and distilled water. After the hydrogels were prepared, it is subjected to a series of tests, i.e., microscopy, hemocompatibility, mechanical strength, impedance measurement, drug release, antimicrobial activity. Cross-linking is achieved by adding a mixture of glutaraldehyde, alcohol, and distilled water. Thus, the best composition of the mixture of the two compounds – Chitosan oligosaccharide and the Carboxy Methyl Cellulose is determined and used for efficient drug delivery.

Index Terms – hydrogel; chitosan oligosaccharide; carboxymethyl cellulose; hemocompatibility.

STRATEGIES TOWARD DEVELOPMENT OF BIODEGRADABLE HYDROGELS FOR BIOMEDICAL APPLICATIONS

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ABSTRACT:

Hydrogel is a macromolecular gel constructed of a network of cross-linked polymer chains. Hydrogels are class of materials that can be tuned toward the subjected stimuli and can be modified to imitate the extracellular environment of the body which makes hydrogel worthy of being used in tissue regeneration, drug delivery, and other fields of science. Hydrogels offer excellent potential as oral therapeutic systems due to inherent biocompatibility, and biodegradability. Hydrogels are having various tissue engineering and drug delivery application due to its high loading with ensured molecule efficacy, high encapsulation, variable release profile, stable, and inexpensive.

Index Terms – Hydrogel; polymer; tissue regeneration; drug delivery; encapsulation.

COMPUTING THE PROBABILITY OF RNA SILENCING AND QUANTIFICATION OF RNAI PROCESS IN PLANTS

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ABSTRACT:

RNA silencing is a post-transcriptional gene silencing strategy that enables the specific gene sequence to silence its mRNA translation process by cleaving or destructing it. Basically in plants RNA silencing is used to silence the disease-causing protein and preventing the infection of pathogens not to produce any disease. To design the specific RNA and its target prediction help us to develop a disease-resistant plant for that we need bioinformatics tools and databases to produce mi-RNA for that we need to know the exact process of RNA silencing. In basically RNAi process includes dicer protein RISC complex and plays a major role in gene silencing, dicer protein cuts the double-stranded RNA into a specific RNA sequence called micro RNA (length-21-28) which binds with the RISC complex.. To do this process in the lab there are technology developed and software to analyze the off-target region. Now discussion is about to explain what are the mi-RNA databases and how to know the off-target predictions done, using the following informatics tools. There are many mi-RNA databases available online for specific gene silencing. Among them, the widely using database is miRBase available in the following link <http://www.mirbase.org/index.shtml> we can find mi-RNA sequence for mi-RNAs. We can find target -off-site region using many online tools, use of Si-Fi (Si-RNA Finder) tool to design si-RNA, and its off-target regions is the best tool.it is an open-source python software and also available in windows version, in this tool is helpful to create a database of sequences and designing the RNAi for sequences.it also helps to analyze the off-target regions. These tools are highly efficient in generating micro RNAs to perform post-transcriptional gene silencing in plants and also helps develop plants against disease-causing viruses and worms, which helps in decreasing the usage of pesticides.

Index Terms – RNA silencing; mRNA translation; RISC complex; Si-RNA; python software.

IN SILICO ANALYSIS OF HPV E6 AS DRUG TARGET WITH NATURAL ANTIOXIDANTS

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ABSTRACT:

Human papillomavirus (HPV) infecting mucosal and cutaneous epithelia and induce cellular proliferation are small, non-enveloped, epitheliotropic, double-stranded DNA viruses. HPV is infected to others through sexual contact without showing any physical symptoms. The symptoms of HPV infection comprise warts on the genitals surrounding skin. Infection of HPV accounts to 70% of cervical cancer including cancers of the anus, vulva, vagina, penis and oropharynx. HPV types contain the genomes comprising eight ORFs transcribed from a single DNA strand; ORF comprises three functional parts; viral replication encoded by the early (E) region comprising E1-E7 proteins; virion assembly encoded by the late (L) region comprising the L1-L2 proteins; and the replication and transcription of viral DNA is encoded by a long control region (LCR) is a non-coding part possessing the *cis* elements. To understand the route of malignancy in humans by which E6 protein of HPV is resulting, much research is focused on identifying the cellular proteins with which E6 interacts. This study is focused on identifying the best ligands such as carrageenan, curcumin and papain available in natural sources such as fruits and vegetables to target HPV E6 Protein B-chain as drug target against antioxidants in the cancerous individuals. This was carried out with the three dimensional structures of ligands from pubchem and protein from protein data bank and the docking was performed by Autodock Vina. Minimal energy was noticed upon docking with carrageenan and it was the best over the other two selected ligands curcumin and papain.

Index Terms – HPV E6, Drug target, carrageenan, curcumin, papain

CELL VIABILITY STUDIES AND ANTI-CANCEROUS ACTIVITY EVALUATION OF POMEGRANATE (PUNICA GRANATUM L) EXTRACT

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ABSTRACT:

Pomegranate, *Punica granatum* L belonging to the family Lythraceae is a widely used plant having medicinal properties. Pomegranate gained considerable recognition as a functional food in the modern era. In light of the importance of pomegranate extract as an anti-cancerous agent, an attempt was made to analyze its anti-cancerous activity by studying the toxicity studies on the cancerous cell lines by treating with pomegranate peel extract and studying the viability of cancerous cell lines. Dried pomegranate peel extract powder was obtained by rotary evaporation and freeze drying. The percentage viability of HCT 15 and T47D cancer cells carried out by using Trypan blue staining were 73.46%, 78.35% respectively which are most suitable to perform cytotoxicity studies. With the increase in the concentration of the pomegranate peel extract (20 to 120 µl/ml acetone, methanol and ethyl acetate pomegranate peel extracts); the percent viability of cells tends to decrease.

INDEX TERMS – Pomegranate extract, Cell viability, Trypan blue staining, MTT assay.

IN SILICO DRUG INTERACTION STUDIES ON HIV INTEGRASE

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ABSTRACT:

The infection of HIV causes AIDS, which is a prevalent problem today. Retroviral infection happens upon the integration of a copy of the DNA of the viral genome into the host DNA at any location in the genome but is preferred in certain regions of the chromatin as a necessary step in the replication. The challenge in the treatment of retroviral infections is that the integrated viral DNA is sustainably maintained and replicated along with cellular DNA through the cell division. Although wide prospects have been made in antiviral therapy of HIV, the integrated virus persists in long-lived cells and eradication is an elusive goal. Integrase protein is the key enzyme in the virus that integrates retroviral DNA into the host genome. As the rapid development of drug resistance in the existing drug classes, discovery of new targets is the need of the hour. The three major enzymes of HIV-1 integrase IN (HIV-1 IN), protease, and reverse transcriptase have been of special interest. Integration of viral genetic material with the host genome is an important step in the process of viral replication catalyzed by HIV-1 IN. 6 chloro 2 oxo 4 phenyl 1,2 dihydroquinolin-3-yl acetic acid, Quinoline class of inhibitors of HIV-1 integrase, was used in the present study to analyze the drug-protein interaction.

Index Terms – HIV-1 IN, 6 chloro 2 oxo 4 phenyl 1,2 dihydroquinolin-3-yl acetic acid, energy minimization.

INSILICO INTERACTION STUDY OF H1N1 VIRAL PROTEINS AND ROLE OF PB1 IN REASSORTMENT IN PATHOGENICITY

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ABSTRACT:

Protein-Protein interactions will provide a wealth of information to know the amino acid residues, type of interaction between proteins, and so on; understanding the factors which are responsible for the transmission of S-OIV (Swine origin influenza virus) from human to human is of great interest. In this scenario, a promising study on different influenza viral proteins and their interaction with other proteins of the virus and with the proteins of the host are studied. Our present paper is focused on the Insilco interaction study on H1N1 viral proteins namely, Hemagglutinin, (HA) Polymerase basic1 (PB1), Polymerase basic2 (PB2), Matrix protein1 (M1), Matrix protein (M2) and especially the role of PB1 protein in reassortment pattern. Phylogenetic study of H1N1 proteins: [PB1, PB2] with FIG TREE and docking study of PB2 with its host receptor using HEX5.1 is studied. We have traced out computationally the degree of conservation in HA protein; event of multiple reassortment, strains involved [H1N1, H2N2 and H3N2] in it; binding energy of PB2 C-terminal domain was proved to be low. Changes in the amino acid residues with positions in case of 2009 strain are elucidated., and finding the ligand binding sites of both M1 and M2 Proteins were carried out using Q-Site Finder, which can be further studied in the computer aided drug design [CADD].

Index Terms –Hemagglutinin (HA), Polymerase basic1 (PB1), Polymerase basic2 (PB2), Matrix protein (M1, M2), Reassortment, Multiple Sequence Alignment (MSA), Docking.

OSTEOGENIC DIFFERENTIATION ABILITY OF HUMAN MESENCHYMAL STEM CELLS ON CHITOSAN/POLY (CAPROLACTONE)/NANO BETA TRICALCIUM PHOSPHATE COMPOSITE SCAFFOLDS

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ABSTRACT:

Our work depicts the development and characterization of Chitosan/Poly (caprolactone)/nano beta Tricalcium phosphate (CS/PCL/ β -TCP) porous composite scaffolds by freeze drying method. Addition of PCL to CS/ β -TCP composite scaffolds had significantly increased the compressive strength besides decelerating the degradation rate. Human mesenchymal stem cells(hMSCs)were chosen to assessin-vitro biocompatibility of the prepared scaffolds in terms of cell viability, cell attachment and proliferation by MTT assay, SEM and DNA Quantification assays respectively. Further, increased osteogenic differentiation assay results(Alkaline Phosphatase assay and Total calcium content)revealed the role of β -TCP in composite scaffolds. Altogether, results suggest the potentiality of prepared porous freeze dried composite scaffolds in bone tissue engineering applications

Index Terms – Polycapro lactone, chitosan, tricalcium phosphate, human mesenchymal stem cells, compressive strength, compatibility

PLA/PEG SCAFFOLDS FOR TISSUE ENGINEERING APPLICATIONS: IN-VITRO CYTOCOMPATIBILITY

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ABSTRACT:

An ideal tissue engineering scaffold material should be biodegradable, biocompatible, and also must possess adequate mechanical strength. The aim of this work is to develop Poly-lactic acid and Polyethylene glycol (PLA-PEG) composite scaffolds with varied weight ratios of polymers to meet the essential characteristic features of scaffold used in tissue engineering. These scaffolds were prepared using the solvent casting-particulate leaching technique and characterized with respect to pore size, mechanical strength, in-vitro degradation, and cytocompatibility of Human Mesenchymal stem cells (hMSC's). We have observed that the increased PEG content in the composite scaffold increases the degradation rate, and also larger pores formed. All the scaffolds were exhibited the pore size in the range of 224-327 μm . The metabolic activity of hMSC's on scaffolds results indicated that all the scaffolds are cytocompatible. The cell attachment on the scaffolds also displayed, which proved that cells are well compatible and adhere to the scaffolds. In summary, the results directed to continue further studies to specific tissue engineering applications, especially the mechanical strength and pore size of the scaffold had met the bone tissue requirements.

Index Terms- PLA, PEG, solvent casting-particulate leaching technique, mechanical strength, cytocompatibility.

METABOLIC AND ENZYME ENGINEERING FOR THE MICROBIAL PRODUCTION OF ANTICANCER TERPENOIDS

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ABSTRACT:

Terpene or terpenoid or isoprenoid represents the largest class of secondary metabolites and has a variety of applications in food, fragrance, and pharmaceutical industry. Recent advancements and extensive research analysis on various cell lines and animal models have recognized their anticancer potential. To date plants are the major sources of such terpenoid; however, due to low abundance in these natural resources, their extraction from plant is not cost-effective. In addition, several plant species have been heavily exploited due to the presence of such tremendous molecules and have become endangered. The complex structure of terpenoid also limits their production from chemical routes. Therefore, to overcome the limitations in plant-based extraction and chemical synthesis of terpenoids, several microbial hosts have been exploited for the production of therapeutically important terpenoids including precursors of anticancer terpene, paclitaxel, or Taxol. Here, we summarize the biosynthesis terpenoids in natural system and advances in their production from microbial sources. In silico analysis is done to explore the physicochemical properties of an important enzyme (IspA) of terpenoid biosynthesis pathway, which is responsible for the supply of an isoprenoid precursor, FPP. The enzyme is functionally explored to construct its near-native protein model by comparative modeling. The most and the least conserved residues are lastly traced in this class and structurally localized to delineate the further research.

Index Terms – DXS, Terpenoid, IspA, directed evolution, enzyme design.

DECODING THE VITAL SEGMENTS IN HUMAN ATP-DEPENDENT RNA HELICASE

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ABSTRACT:

An analysis of the ATP-dependent RNA helicase using known functionally close analogs helps disclose the structural and functional information of the enzyme. The enzyme plays several interlinked biological functions and there is an urgent need to interpret its key active site residues to infer function and establish role. The human protein q96c10.1 is annotated using tools such as INTERPRO, GO and CDD. The physicochemical properties are estimated using the tool PROTPARAM. We describe the enzyme protein model developed using Modeller to identify active site residues. We used Consurf to estimate the structural conservation and its evolutionary relationship is inferred using known close sequence homologs. The active site is predicted using Castp and its topological flexibility is estimated through cabs-flex. The protein is annotated as a hydrolase using available data and ddx58 is found as its top-ranked interacting protein partner. We show that about 124 residues are found to be highly conserved among 259 homologs, clustered in 7 clades with the active-site showing low sequence conservation. It is further shown that only 9 loci among the 42 active-site residues are conserved with limited structural fluctuation from the wild type structure. Thus, we document various useful information linked to function, sequence similarity and phylogeny of the enzyme for annotation as potential helicase as designated by Uniprot. Data shows limited degree of conserved sequence segments with topological flexibility unlike in other subfamily members of the protein.

Index Terms – RNA helicase, innate immunity, motif, MODELLER, flexibility.

COMPUTATIONALLY EVOLVING THE INVERTASE ENZYME TO IMPROVE ITS THERMAL STABILITY

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ABSTRACT:

Invertase enzyme, commonly found in plants, yeast and other micro-organisms, is a β -fructofuranosidase that catalyzes the formation of fruit sugar and glucose from sucrose, and has an optimal activity at pH 4.5 and stability at 50°C. It boosts the immune system in human, as an antioxidant and antiseptic molecule. As extraction from other sources is majorly dependent on chemical methods, the efficiency and yield is quite lower than 35%. The enzyme is computationally evolved and is shown to sustain a harsh industrial condition with improved binding affinity to sucrose. The invertase structure is scrutinized for the residues within 5Å from the active site, and the site is extensively analyzed for the biologically feasible mutants with improved activity. Deploying the docking protocols across the functionally conserved active sites along with the energetic scoring at the key sites is found to substantially improve the thermostability of the enzyme.

Index Terms – Invertase, sucrose, docking, ddG, Rosetta.

BIBLIOMETRIC NETWORK ANALYSIS OF MACHINE LEARNING IN LIFE SCIENCES

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ABSTRACT:

Machine learning, a rapidly evolving field of data analysis has now become an integral part of life science research. It is widely used for exploring the information encoded by the genomes and beyond the genome. In this study, we have evaluated the trends of machine learning implementation in biomedical research through the published literature retrieved from the PubMed search engine. A longitudinal cohort bibliographic coupling was executed by utilizing the VOS viewer tool for four time periods, 1964-2010, 2011-2015, 2016-18, and 2019-20. Co-word analysis revealed that the conceptual framework of the machine learning applications in life sciences moved from simple pattern searching to omic science and medical imaging analytic approaches, and from Baye's theorem to deep learning algorithms. It is observed that presently machine learning is extensively used in investigating emerging situations like Coronavirus disease. To epitomize, researchers capitalized advancements in machine learning tools and high-throughput technologies to delve into the intricate and evolving concepts of biology and medicine.

Index terms: Machine learning, science mapping, bibliographic coupling, VOS viewer tool, and Pub Med.

SURVEY ON DEEP LEARNING APPLICATION IN ACADEMICS AND LIFE-SCIENCES

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ABSTRACT:

Deep learning is also known as neural learning and deep neural networks. It is a type of machine learning algorithm based on artificial intelligence with representation learning. Deep learning is a modern and exhilarating field of machine learning. Deep learning is the most suitable machine learning approach. Nowadays, deep learning is used in many sectors like cancer diagnosis, predictive forecasting, self-driving cars, speech recognition, visual recognition, automatic transition, and many others. Deep learning methods mostly rely on artificial neural networks, Specially Convolutional neural networks (CNN)s. Deep learning is such an innovative scheme currently running in trend. It illustrates the classification of learning algorithms that are useful to forecast prediction images. Here, we review the timeline of deep learning, and how deep learning is used in academics and life sciences.

Index Terms – Deep learning, Pub Med, VOS viewer tool, and Medical Subject Headings(MeSH).

DELINEATION OF EUKARYOTIC PROMOTER CLASSES USING CONVOLUTIONAL NEURAL NETWORK AND LONG SHORT-TERM MEMORY BASED DEEP LEARNING MODELS

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ABSTRACT:

Eukaryotic promoter identification is a classical biological problem that should be readdressed with the avalanche of genome sequencing data. Machine learning-based promoter classifiers are often aimed at different promoters and non-promoters. However, the eukaryotic promoter diversified into various classes such as TATA-Box, Inr-element, TCT, and Pause-button, etc. Deep learning a blooming machine learning approach known for its unparalleled performance has now conspicuous in various fields of science and industry. In the current study, we utilized convolutional neural network (CNN) and long short-term memory (LSTM) models to predict promoters belonging to various classes in four model systems, *D. melanogaster*, *C. elegans*, *homo sapiens*, and *mus musculus*. Here, we trained the combined CNN-LSTM model; we call DeePromClass on various classes of promoters. Rather than providing a binary decision of promoter or non-promoter, we classify a chunk of a sequence into promoter-type and non-promoter. The performance of DeePromClass is on par with recent deep learning-based promoter prediction tools such as DeePromoter.

Index Terms – Convolutional neural networks(CNNs), Long Short Term Memory(LSTM), Deep learning models and Promoters.

ACTINOMYCETES AS BIOCONTROL AGENTS

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ABSTRACT:

The search for new biocontrol strategies to inhibit the growth of phytopathogenic microorganisms has become widely widespread due to environmental concerns. Among actinomycetes, Streptomyces species have been extensively studied since they have been recognized as important sources of antibiotics. Actinomycete strains were isolated from a calcareous soil, 2 two-phase olive mill waste ('alperujo') composts, and the compost-amended soil by using selective media, and they were then co-cultured with 5 phytopathogenic fungi and 1 bacterium to perform an in vitro antagonism assay. Forty-nine actinomycete strains were isolated, 12 of them showing a great antagonistic activity towards the phytopathogenic microorganisms tested. Isolated strains were identified by 16S rDNA sequence analysis and phenotypic procedures. Eleven isolates concerned the genus Streptomyces and 1 actinomycete with chitinolytic activity belonged to the genus Lechevalieria.

Index Terms –Actinomycetes, selective media and Lechevalieria.

ASSESSMENT OF GENETIC DIVERSITY IN FOXTAIL MILLET

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ABSTRACT:

Foxtail millet [*Setaria italica* (L.) P. Beauv.] is considered as an important minor millet, grown under varied soil conditions such as drought tolerant crop across the world. This crop has an immense potential for food and fodder in rain fed and arid regions of India. It has a short life cycle and with inbreeding nature. Genetic diversity of this crop is of utmost priority for assessing breeding programs, genetic resource conservation with enhanced yield attributes; identification of putative genes for varied traits evaluated phenotypically. Based on these views, our present study aims at characterization of 60 foxtail millet genotypes by deploying multivariate analysis. The PCA revealed 80.11% of total variability in all the 60 genotypes for the targeted 12 quantitative traits corresponding to 5 Eigen estimation values greater than 0.95. The four principal components (PC) contributed a proportion of 32.19%, 16.97%, 13.44%, 9.60% each of the total variance. Clustering through similarity matrix 60 genotypes were grouped into seven clusters. Major one (Cluster-1) with highest number of genotypes viz., 14 genotypes followed by cluster 2, 3, 4, 5, 6 and 7 established with 11, 8, 8, 7 and 4 genotypes individually. Moreover, it was also implicated that Days of maturity (67.06), number of productive tillers per plant (9.83), single plant grain yield (7.01), panicle exertion (6.89) contributed maximum towards total divergence. This study implies the substantial genetic diversity of the core collection of genotypes used in the study based on the morphological and phenotypic variability; hence giving these traits an emphasis in foxtail improvement programs.

Index Terms – genetic diversity, millet and genotype

ADVANCEMENTS IN MOLECULAR MARKER TECHNOLOGIES AND THEIR APPLICATIONS IN PLANT DIVERSITY STUDIES

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ABSTRACT:

To cope up with the higher demand of food nearing 40% by 2020, immediate attention on crop improvement is demanded with a continuous effort, since from the evolution of man that dates back some 10,000 years ago. With the development of molecular marker technology in the 1980s, the fate of plant breeding has changed. Therefore in plant breeding, crop improvement, genetic markers and advances have occurred in genomic era. Novel and contemporary advances in DNA sequencing technology have brought quite a lot of novel podiums for marker development and have been exploited worldwide in different systems with global acceptance. Recent advances in molecular markers have become important tools for a large number of applications ranging phylogenetic analysis, diversity studies, construction of genetic and comparative maps, detection of novel allele, region-specific marker saturation, gene tagging, marker-assisted selection, varietal/line identification, hybrid identification, seed testing, fingerprinting, introduction of alien gene etc. facilitating the identification of novel genetic lines that can be used as parental lines for crop improvement programs for high yield, tolerance to a variety of biotic and abiotic stresses with improved nutrition. Thus molecular markers are considered as valuable tools for genome analysis even in crops where the whole genomes are sequenced. This review brings out the cross talk among the recent advances in molecular markers, strategies for crop diversity studies and their applications in crop breeding programs.

Index Terms – Molecular Markers, Genetic markers, Plant breeding, biodiversity, applications

ADAMS OLIVER SYNDROME

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ABSTRACT:

Adam's Oliver syndrome (AOS) [lehmen A] is an atypical hereditary congenital disorder, but most cases reported so far are sporadic. Patients primarily show aplasia cutis congenita (ACC) of the scalp where lesions are in midline or occipital regions and sometimes also on the abdomen or limbs, and terminal transverse limb defects (TTC) [Garzon MC]. The patients have underdeveloped skin and hair growth is absent in the affected regions. Sometimes, patients also have cutis marmorata telangiectatica congenita. ACC is seen in almost 80% of the patients and TCC in 85%. Terminal transverse defects many of the time refer to abnormal nails, fingers or/ and toes. The fingers and toes can be fused (syndactyly), short (brachydactyly) or be missing altogether (oligodactyly). In some patients, bones of arms and lower limbs are malformed or missing. Patients can develop pulmonary hypertension and other blood-heart defects. They can also suffer abnormalities in the brain and less frequently renal, liver, and eye anomalies. Although rare, severe morbidity and mortality results from haemorrhage or infection involving large and deep calvarial lesions, or from cardiovascular anomalies including severe heart malformations.

Index Terms –Oliver syndrome, cardiovascular anomalies, and health care

AN INSILICO STRATEGY AGAINST ADAM'S OLIVER SYNDROME BY PREDICTING RNAI MOLECULES AGAINST DOMINANT GENES BY SUPPRESSING RHO- GTPASES.

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ABSTRACT:

Adam's Oliver syndrome is an inherited congenital disorder, following either a dominant or recessive pattern. It has two key features, namely, Aplasia Cutis Congenita (ACC) and Terminal Transverse Limb Defects (TTLD). This is characterized by scalp and cranium defects, along with limb abnormalities. These key features are accompanied by vascular and neurological defects in most cases. Individuals suffering from AOS can have mild growth deformities as well. The severity depends on the family's history and the causative mutations. There are 6 genes (ARHGAP31, DLL4, NOTCH1, RBPJ, DOCK6, EOGT) reported so far, which can cause this syndrome. These genes are a part of cell signalling, out of all these genes here we analysed that ARHGAP31, DLL4, NOTCH1, and RBPJ genes cause the autosomal dominant variant of this disorder. Mostly sporadic cases were observed in this disorder. So, we collected retrieval CCDS and CDS sequences of each gene from the NCBI database. CDS sequences of each gene were taken and Multiple Sequence Alignment was done using ClustalΩ. After target identification we have chosen ARHGAP31 as the target gene and designed the siRNA and miRNA, by taking CCDS DNA sequence of genes, using the tool Invitrogen Block-iT. Proteins related to ARHGAP31 were obtained using Blastx. GC content analysis of ARHGAP31 was done using ENDMEMO and RNA-RNA interaction is interpreted using IntaRNA. Heat Capacity was analysed using Oligocalc online server and prediction of secondary structure was done using Modeller9.22 and SAVES.

Index Terms – Oliver syndrome, cardiovascular anomalies, and health care

COMPARATIVE MODELING OF PATHOGENESIS RELATED PR5 PROTEIN OF MUSA ACUMINATA WITH THE THREE-DIMENSIONAL STRUCTURE OF 1ZQ3 OF MUSA PARADAI SIACA.

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ABSTRACT: :

The objective of this work is to perform comparative modelling of pathogenesis related protein (PR5) of *Musa acuminata* with the three dimensional structure of chain A protein (1ZQ3). Pathogenesis related proteins are associated with the defensive mechanism, of plants, during pathogenic attack. Usage of antifungal agents, containing PR5 protein, against bacteria and pathogens, will help in increasing the crop yield. This work aims for modelling of PR5 structure using homology modelling, considering the available structure of 1ZQ3 of *Musa paradai siaca* as a reference. Since PR5 is important in pathogenic activities in plants, against the fungi and bacteria, the three dimensional protein structures was modelled by using Modeller 9.17, a simulator that would help in perceiving the modelled structure better. The PR5 and 1ZQ3 sequences when aligned using BLAST P, showed significant similarity. Comparative modelling of PR5 helps in the study of defensive mechanism in the *Musa acuminata* and its structural integrities.

Index Terms –BLAST, homology modeling and modeller

IRON RESTRICTED ERYTHROPOIESIS: THE COMPLEX INTERPLAY OF INFLAMMATION AND IRON STATUS

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ABSTRACT:

INTRODUCTION: Chronic infections are usually accompanied by anemia and elevated hepcidin levels and consequently, iron restricted erythropoiesis. Hepcidin regulates the expression of ferroportin, the principal iron export protein in the body, thereby playing a major role in determining body iron status. Several factors affect hepcidin levels including hypoxia, inflammation, and total body iron stores (Blood Res. 2013;48:10). Since both inflammation and iron status influence hepcidin, patients with chronic infection (HIV and tuberculosis (TB)) and anemia were studied to understand this interplay. We hypothesized that chronically infected patients with superimposed iron deficiency would have lower hepcidin levels than chronically infected patients without iron deficiency. **METHODS:** Using sex adjusted WHO hemoglobin values, subjects were categorized into healthy individuals (n=90), those having pure IDA (n=90) and those having anemia of inflammation (AI) (HIV =90 and TB =90). Non-anemic patients with HIV and TB were also recruited (n = 30 each). The soluble transferrin receptor (sTfR)/log ferritin (F) index (Am J Hematol. 2011, 86:923) was used to distinguish patients with pure AI (sTfR-F index <1.03) or AI with superimposed IDA (sTfR-F index ≥1.03). All laboratory analytes were measured using standard commercial assays. Inflammatory markers were assessed semi quantitatively using human cytokine array kit (AAH-CYT-1, RayBiotech, Inc USA).

Index Terms – Anaemia, erythropoiesis and hemoglobin

CANCER RELATED ANEMIA HAS A HIGH PREVALENCE AND ADVERSELY IMPACTS QUALITY OF LIFE.

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ABSTRACT:

Cancer related anemia (CRA) adversely affects patient Quality of Life (QoL) and overall survival. We prospectively studied the prevalence, etiology and the impact of anemia on QoL in 218 Indian cancer patients attending a tertiary referral hospital. The study used the sTfR/log Ferritin index to detect iron deficiency anemia and assessed patient QoL using the Functional Assessment of Cancer Therapy-Anemia (FACT-An) tool, standardized for language. Mean patient age was 51±13 years and 60% were female. The prevalence of cancer related anemia in this setting was 64% (n = 139). As expected, plasma ferritin did not differ significantly between anemic (n = 121) and non-anemic cancer patients (n = 73). In contrast, plasma sTfR levels were significantly higher in anemic cancer patients compared to non-anemic cancer patients (31 nmol/L vs. 24 nmol/L, p = 0.002). Among anemic cancer patients, using the sTfR/log Ferritin index, we found that 60% (n = 83) had iron deficiency anemia (IDA). Interestingly, plasma sTfR levels were significantly higher in cancer patients with CRA+IDA (n = 83) compared with patients having CRA (n = 38) alone (39 nmol/L vs. 20 nmol/L, p<0.001). There was a significant linear correlation between Hb and QoL (Spearman $\rho = 0.21$; p = 0.001) and multivariate regression analysis revealed that every gram rise in Hb was accompanied by a 3.1 unit increase in the QoL score (95% CI = 0.19-5.33; p = 0.003). The high prevalence of anemia in cancer patients, a major portion of which is due to iron deficiency anemia, the availability of sensitive and specific biomarkers of iron status to detect IDA superimposed on anemia of inflammation, suggests an urgent need to diagnose and treat such patients. Despite the potential negative consequences of increasing metabolically available plasma iron in cancer, our clinical data suggest that detecting and treating IDA in anemic cancer patients will have important consequences to their QoL and overall survival. Clinical trials of iron therapy in these patients will be able to demonstrate the potential for benefit or harm.

Index Terms – Anaemia, cancer and ferritin index

THERMODYNAMIC STUDIES OF THE REMOVAL OF LEAD FROM SYNTHETIC WASTEWATER USING CYPERUS ROTUNDUS

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ABSTRACT:

This research was accomplished to appraise the performance of Cyperus Rotundus Stalk (CRS) in adsorption of lead heavy metalofaquatic environments. For this purpose, the batch system was used for review the effect pH, Mixing time, adsorbent particle size and temperature for Pb(II) removal on the CRS. The highest lead removal efficacy was achieved in pH=6 and it was considered as the optimum pH. The result indicated the maximum Pb(II) adsorption at the contact time of 90 min which implies that increase in contact time lead to a higher lead uptake. The amount of R2 using the pseudo-second-order are greater than compare with others models. Influence of temperature was determined by using thermodynamic parameters and the results showed removal of lead on the CRS was endothermic, spontaneous and feasible.

Index Terms - Pb(II); Cyperus rotundus stalk (Nut grass); Thermodynamics, Kinetics; Synthetic Wastewater

STUDIES ON NOX REMOVAL USING DUNALIELLA SALINA ALGAE IN PHOTOBIOREACTORS

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ABSTRACT:

The capability of an algal species to remove NO₂ and NO in the simulated flue gas was established using *Dunaliella salina* in Photobioreactors under two variants of NO_x sources. The concentrations studies were in the range between 25ppm to 150ppm. The diffusion of NO_x and subsequent reaction with water resulted in NO₃⁻ and NO₂⁻ in the growth medium. Algal growth by absorption of NO₃⁻ and NO₂⁻ created a nitrate gradient in the bulk medium resulting in NO_x uptake rates from the gas phase of up to 96%, leaving the unconsumed nitrogen of up to 7 mg-N/L in the growth medium. Algal species having an initial cell density of 2.8x10⁵ cells/mL grew to the cell density of 1.73x10⁷ cells/mL and dry weight of 262 mg/L. The Nitrogen content of cells varied from 3-6%. The treatment of NO_x in Photobioreactors was investigated with reference to the gas removal efficiency, cell growth and total nitrogen content in the biomass.

Index Terms - Dunaliella Salina, Photobioreactors, Algal Growth

CHARACTERIZATION AND CONTINUOUS PRODUCTION OF ETHANOL USING IMMOBILIZED YEAST CELLS

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ABSTRACT:

In this study, characterization of the immobilized yeast cells for ethanol production by varying the initial sugar and yeast cell concentration was performed. The results have indicated that the effective fermentation can be achieved using 1% of the immobilized yeast cells with 10-12% of initial total reducing sugar concentration. The role of plant and fungal based chemicals as activators were studied and the studies indicated that Chitin and Rhizopus Oryza biomass has shown significant effects of increase in fermentation rate (47% and 23.94%) in free and immobilized cell –activator systems respectively. Continuous ethanol production studies with immobilized yeast cells suggested that the productivity can be improved up to 100% by reducing retention time. Also, these studies confirmed the reusability of beads for up to 16 days without losing activity.

Index Terms: Ethanol Fermentation, Molasses, Immobilization, Activators, Reducing S

CHARACTERIZATION AND SCREENING OF BIOSURFACTANT FROM MICROORGANISM WITH A WIDE APPLICATION IN FOOD INDUSTRIES

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ABSTRACT:

Food industrial sector play a very important role in raising the economic status of a country, since it is necessary to enhance the productivity and maintenance of food industry. To maintain the quality operation of food industry it is necessary to reduce the spoilage of food during processing, packing or storage of food materials. Different precautions measures like adding chemical surfactants, temperature treatment and antimicrobial chemical agents can be used to reduce the spoilage of food but it cause adverse health effects for the consumers. Biosurfactants are the biochemical formulation obtained from microbial sources has surface active and antimicrobial property. These properties of biosurfactants help in preventing the spoilage of food and made it as a preeminent harmless process. Therefore in the proposed paper , discuss in detail about the methods of characterization and screening of bio-surfactant from microbial sources which are widely used in different sectors of food industry.

Index Terms: Food, Spoilage, Biosurfactants, Characterization, Screening

THE REMOVAL OF WASTEWATER CONTAMINANTS- BIOLOGICAL APPROACH .

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ABSTRACT:

Water is essential criterion present in nature, termed as elixir for origin, existence and evolution of living organisms. Increase in population led to rapid increase of industrial activity which disposes huge amount of untreated waste water/ effluent to natural environment creates environmental pollution and intimidating the human health. Environmental legislation has significantly contributed to the introduction of sustainable waste water treatment observes throughout the globe. The ultimate goal of wastewater treatment plants are used to achieve the permissible limit for discharge of wastewater stipulated by environmental conservation and protection organizations like WHO (World Health Organization), pollution control boards etc. Waste-water quality may be defined by its chemical, physical and biological characteristics. In that context different phase of wastewater treatment process are conducted to remove physical, chemical and biological pollutants from wastewater streams. Therefore, this paper discuss the traditional biological way of industrial, commercial and residential waste water treatment plants and there unit operations.

Index Terms: Water, Industrial, Pollutants, Waste water, Treatment plants

STUDY PRODUCTION AND CHARACTERIZATION OF SILVER NANOPARTICLES USING AQUEOUS EXTRACT OF TRIGONELLA FOENUM GRAECUM

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ABSTRACT:

Recently a nanoparticle plays a very important role in biomedical, food and environmental application. Physical, chemical, and biological methods are commonly used for the synthesis of nanoparticle among them biogenic synthesis have greater significance because of less toxic, eco-friendly and inexpensive, when compare to physical and chemical methods of synthesis. On other hand biosurfactants are the biochemical devising obtained from microorganism has potential surface active and antimicrobial property. In the present study, biogenic synthesis and characterization of silver nanoparticles using aqueous extract of *Trigonella foenum graecum* were investigated. The significant results show that the presence of antimicrobial activity and hemolytic compatibility of formulated silver nanoparticles. The resultant nanoparticle confirms that it can be used for both biomedical, food and environmental applications.

Index Terms: Nanoparticle, Biogenic synthesis, Trigonella foenum graecum, biosurfactants , surface active, antimicrobial property.

STATISTICAL OPTIMIZATION OF MEDIUM COMPONENTS FOR THE PRODUCTION OF BIOSURFACTANT BY ACHROMOBACTER XYLOS GSR21

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ABSTRACT:

In this paper the advancement of the basic medium segments for bio-surfactant creation from *achromobacter xylos strain GSR21* using statistical experimental design. Response surface method (RSM) was utilized to decide the ideal degrees of cycle factors (agar powder, yeast concentrate, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, and KH_2PO_4). Central composite design (CCD) of RSM was utilized to contemplate the four factors at five levels, and bio-surfactant fixation was estimated as reaction. Regression coefficients were determined by regression analysis, and the model condition was resolved. R^2 esteem for bio-surfactant (g/L) was tried to be 0.72, demonstrating that the model fitted well with the exploratory outcomes. Confirmation of the numerical model was led by playing out the investigation with the anticipated upgraded values, and bio-surfactant yield was discovered to be 9.69 g/L. Approval of the anticipated model was fitted 96.9% with the test results directed under the ideal conditions. Agar powder and yeast remove was recognized as effective segments for bio-surfactant (*Achromobacter xylos GSR21*) creation.

Index Terms: *Achromobacter xylos; Bio-surfactant; Central composite design; Response surface methodology.*

ROLE OF MEDIUM COMPONENTS FOR THE PRODUCTION OF BIOSURFACTANT BY *ACHROMOBACTER XYLOS* GSR-21

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ABSTRACT:

Bio surfactants are used to reduce the surface tension between molecules and also plays a major role in microbial enhanced oil recovery and potential uses in territories, which include environmental remediation, agriculture, bio film formation, quorum sensing, textile, prescribed drugs, cosmetics, and the food, oil, and petrochemical industries. In the present paper, optimization of medium components for biosurfactant production by *Achromobacter xylos* GSR-21 using statistical experimental design was studied. The mineral salt medium requirement for biosurfactant production by Glycolipid *Achromobacter xylos* was optimized. The important medium components, identified by the initial screening method of Plackett-Burman and response surface quadratic methodology was applied to further optimize bio surfactant production. Regression coefficients were calculated by regression analysis and the model equation was determined. R^2 value for biosurfactant (g/L) was calculated as 0.88, and it indicates that the model was well fitted with the experimental results. The important medium components, identified by the initial screening method of Plackett-Burman, were KH_2PO_4 , NH_4NO_3 and Glycerol (g/l). Response surface quadratic methodology was applied to further optimize biosurfactant production. The maximum biosurfactant production (*Achromobacter xylos*) (17.9 g/L) was predicted at the optimized values of KH_2PO_4 -20 (g/l), glycerol-30 (g/l) and NH_4NO_3 -20(g/l). Surface plots were made, and the obtained mathematical model was verified by performing the experiment with the predicted optimized values, and the yield of bio-surfactant was found to be 9.89 g/L. Validation of the predicted model was fitted 98.9% with the experimental results conducted at the optimum conditions. Results of this statistical analysis showed that KH_2PO_4 , glycerol and NH_4NO_3 had found significant medium components for biosurfactant (*Achromobacter xylos*) production.

Index Terms: *Achromobacter xylos* GSR-21, PB Design, RSM, MSM Media

OPTIMIZATION OF THERMO-PHYSICAL PROPERTIES FOR THE BINARY SYSTEM OF ACETONE-WATER AT 303.15-318.15 K BY RESPONSE SURFACE QUADRATIC MODEL

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ABSTRACT: Densities, viscosities, ultrasonic velocity, refractive indices and surface tension values for acetone (1) + water (2) mixtures were measured at temperatures of 303.15K to 318.15K for the whole composition ranges and atmospheric pressure. These experimental values have been used to calculate the respective excess properties along with some acoustic properties. The experimental data and excess properties have been used to calculate the interacting coefficients and standard deviations from different existing models. Also the new model equations have been developed by using Design Expert program (response surface quadratic model) for density, viscosity, ultrasonic velocity, refractive indices and surface tension. Experimental results were analyzed on the basis of molecular interactions between component molecules with the help of FT-IR spectrum.

Index Terms: Density, viscosity, ultrasonic velocity, refractive indices, intermolecular interactions, FT-IR spectrum.

DEVELOPMENT OF SPIRULINA CHOCOLATE BAR AS AN ENRICHED PROTEIN FOOD PRODUCT

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ABSTRACT:

The purpose of the study was to enhance the nutritional quality of existing product (chocolate) using Spirulina. Nutritional deficiency one of the most important nutritional problem across the world particularly in children. We addressed the problem and developed the Spirulina chocolate in the laboratory scale. The developed and investigated the spirulina chocolate contains all the essential nutrients such as vitamins, minerals and 50-60% proteins (more than beef, chicken and soybeans). This energy bar boosts children's immune system while reducing allergic reactions. Functional foods are modified foods that give additional health and nutritional benefits for human health care. Spirulina is the only natural food that contains GLA as an essential fatty acid that is found only in mother's milk. In this study, we developed a chocolate bar of Spirulina, which is healthy, delicious, convenient snack and can be consumed as a part of meal or snack. Spirulina Chocolate was safe and easy way to help the children to maintain a balanced diet.

Index Terms – Spirulina, GLA, Vitamin, Protein, Chocolate.

THERAPEUTIC TARGETS IDENTIFICATION OF NIPAH VIRUS BY THE APPROACH OF SUBTRACTIVE PROTEOMICS AND GENOMICS

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ABSTRACT:

The completion of genome sequences of pathogenic bacteria and the completion of human genome project has provided lot amount of data that can be utilized to design vaccines and drug targets. One of the recently adopting strategies for drug designing is based on comparative genomics and proteomics approach, in which the subtraction dataset between the host and the pathogen genome provides information for a set of genes that are likely to be essential to the pathogen but absent in the host. We have used the same approach to identify the vaccine and drug targets of NIPAH Virus. Our analysis has revealed that out of 1200 coding sequences of the pathogen, 5 represent essential genes that have no human homolog. The details of these five essential gene names ARE *N-NVGP1*, *N-NVGP2*, *M-NVGP 3*, *F-NVGP 4*, AND *G-NVGP* respectively. The corresponding and gene identification (GI) numbers are 51920951, 920952, 920953, 920954, and 920955 respectively. This preliminary work reported here identifies a small subset of the Clostridium botulinum A strain proteome that might be investigated further for identifying potential drug and vaccine targets in this pathogen. The computational genomics approach stated here is likely to speed up the drug and vaccine discovery process.

Index Terms–NIPAH Virus, Subtractive genomics, Comparative genomics, Vaccine targets.

STUDY OF ABIOTIC AND BIOTIC DEGRADATION OF POLYETHYLENE BY FUNGAL ISOLATE ASPERGILLUS ORYZAE

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ABSTRACT:

Synthetic polymers (plastics) are widely used in industry and agriculture. Because of their high durability, they accumulate in the environment at a rate of 25 million tons per year. Plastics are not normally biodegradable until they are degraded into low molecular products which can be assimilated by microorganisms. In the present study fungal strain, *A. oryzae* isolated from HDPE film (buried in soil for 3 months) utilized abiotically treated polyethylene (LDPE) as a sole carbon source and degraded it. The films were incubated with the fungal isolate for 3 months complete degradation of carbonyl and carboxylic groups was achieved in FTIR analysis. Scanning electron microscopy of untreated and treated LDPE films also revealed that polymer has undergone degradation after abiotic and biotic treatments. This concludes Photo-oxidation and thermo-oxidation treatment accelerated degradation in the polyethylene film and this resulted in biodegradation due to the consumption of carbonyl and carboxylic groups by *A. oryzae* which was evident by reduction in carbonyl peaks

Index Terms– Photo-oxidation; Aspergillus Oryzae ; Biodegradation, Polyethylene.

SYNTHESIS AND CHARACTERIZATION OF HETEROGENEOUS CATALYST FROM WOOD BIOMASS FOR BIODIESEL PRODUCTION

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ABSTRACT:

In the present investigation, waste wood biomass was used to prepare as low cost sulfonated solid acid catalysts for the transesterification process of waste cooking oil. The pretreated wood biomass first calcined at the temperature of 300 °C, at a heating rate of 50 °C every 30 min for 4 hours then sulfonated with H₂SO₄. The calcined solid acid catalyst was characterized by various analyses such as, Fourier-transform infrared spectroscopy (FTIR), Scanning Electron Microscopy (SEM), Energy Dispersive X-Ray Spectroscopy (EDS) and X-ray diffraction (XRD). The central composite design (CCD) based response surface methodology (RSM) was applied to study the influence of individual process variables such as temperature, catalyst load, methanol to oil molar ration and reaction time on biodiesel yield. The obtained optimized conditions are as follows: temperature (165 °C), catalyst loading (1.625 wt%), methanol to oil molar ratio (15:1) and reaction time (143 min) with a maximum biodiesel yield of 95 %. The ester composition of produced biodiesel was analyzed by Gas chromatography-mass spectrometry (GC-MS).

Index Terms: Catalyst, transesterification, characterization, optimization, biodiesel

PHYCOREMEDIATION OF INDUSTRIAL WASTEWATER STREAMS FOR THE PRODUCTION OF SUSTAINABLE ENERGY

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ABSTRACT:

The growth of urban population, rapid industrialization and advanced living standards of people, a high level of wastewater is generated and it pollutes the available water resources in worldwide. The discharge of untreated domestic and industrial wastewater into natural water bodies is posing a serious issue in developing countries. A numerous physical, chemical and biological methods have been developed and practiced for the treatment of wastewaters. The existing technologies applied for nutrients removal are complex, energy demanding and costly process. Phycoremediation is a potential technique for improving the physiochemical properties of wastewater effluents as it does not require any harmful chemicals and huge energy demand unlike other convention methods. Phycoremediation, which uses microalgae, macroalgae, and cyanobacteria for the reduction, removal or biotransformation of pollutants, is a promising technology that has been highlighted due to its economic feasibility and environmental sustainability. Algal cultivation in wastewater effluent adds value to the process by production of numerous commercially valuable products such as biofuels and other chemicals from algal biomass. In the present situation, huge challenges are imposed on phycoremediation technology, but we need to be optimistic to make use of it for both remediation and commercial applications.

Index Terms: Wastewater, Phycoremediation, sustainability, Microalgae, Biofuels.

ADSORPTION KINETICS STUDIES ON THE REMOVAL OF CONGO RED DYE FROM AQUEOUS SOLUTION USING SAWDUST AS ADSORBENT

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ABSTRACT:

The present study investigates the potentiality of wood sawdust as a low cost adsorbent for the effective removal of Congo red (CR) dye from aqueous solutions. The effect of various parameters such as, initial dye concentration, adsorbent dose, pH contact time and temperature on the removal of CR dye has been studied. The experimental adsorption data were interpreted and fitted with various isotherm models and Langmuir isotherm model was found to be suitable best fit. The maximum dye adsorption was observed at pH 6, with 100 mg/L of dye initial concentration and 80 mg /L of adsorbent dose. The maximum adsorption capacity was found to be 48.31 mg/g. The kinetics study of dye adsorption on sawdust was performed. The experimental data was analyzed with pseudo first and pseudo second order kinetic models and it was observed that the dye adsorption process follows pseudo second order kinetics. These results confirm that raw sawdust powder can be used as potential adsorbent for the removal of CR dye from aqueous solutions in a cost effective and ecofriendly manner.

Index Terms: Sawdust, Congo red, Dye removal, Isotherms, Adsorption kinetics

OPTIMIZATION OF FERMENTATION MEDIUM TO MAXIMIZE THE PRODUCTION OF RECOMBINANT HUMAN ASPARAGINASE IN ESCHERICHIA COLI

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ABSTRACT:

Recombinant human asparaginase (rhASP) from *Escherichia coli* is an important therapeutic enzyme used in the treatment of malignant cancers. Due to such a pivotal role, rhASP production in *E. coli* has drawn great attention of the biopharmaceutical market commercially. The present work aims at the optimization of fermentation medium for the production of rhASP in *E. coli*. The rhASP yield is optimized using sequential optimization designs comprising one variable at a time, Taguchi design, and central composite designs (CCDs). Taguchi design is used to select the effective variables such as soytone, sodium pyruvate, trace element solution, vitamin solution, and yeast extract, which are further optimized by CCD under response surface methodology. The CCD design developed a quadratic model with high adequacy for the prediction of rhASP yield with a statistically significant response toward the variables.

Index Terms – fermentation, inclusion bodies, optimization, recombinant

PRODUCTION OF RECOMBINANT HUMAN ASPARAGINASE FROM ESCHERICHIA COLI UNDER OPTIMIZED FERMENTATION CONDITIONS

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ABSTRACT:

The recombinant human asparaginase (rhASP) plays an important role in the treatment of acute lymphoblastic leukemia. In the present work, volumetric mass transfer coefficient (kLa) values are derived from the E. coli cultivation under different agitation and aeration conditions, in order to improve the rhASP productivity. The aeration and agitation conditions were systematically optimized by the kLa. The maximum biomass (2.4 g/L) and rhASP (1.68 g/L) are achieved with the kLa of 0.024 s⁻¹ at 1.5 lpm and 700 rpm process conditions. The kinetic properties of purified rhASP are also extensively studied and optimized for the maximal enzyme activity. The optimal pH, temperature and incubation duration conditions for accomplishing maximum enzyme activity are found to be 9.0, 40°C and 30 min, respectively. The optimum substrate concentration and substrate specificity for the highest enzyme activity are of 0.07 M and L-asparagine, respectively. The enzyme activity (204 IU/mL) is significantly improved in the presence of sodium metal (Na⁺) ions and the inhibitors 2-mercaptoethanol, bromoacetic acid and urea

have presented the highest inhibition rate on rhASP activity.

Index Terms asparaginase, volumetric mass transfer coefficient, purification.

IDENTIFYING FUNCTION AND ROLE OF OCA2 IN MELANOSOMES

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ABSTRACT:

Skin melanocytes and ocular pigment cells contain specialized organelles called melanosomes, which are responsible for the synthesis of melanin, the major pigment in mammals. Defects in the complex mechanisms involved in melanin synthesis and regulation result in vision and pigmentation deficits, impaired development of the visual system, and increased susceptibility to skin and eye cancers. Ion transport across cellular membranes is critical for many biological processes, including pigmentation, but the molecular mechanisms by which it regulates melanin synthesis, storage, and transfer are not understood. In this topic we discuss OCA2 protein. OCA2 protein is a one of the important proteins in the melanocytes. And it also regulates the PH in the melanosomes. PH is a one of the important factors for the production of any biological process.

Index Terms: P-protein, oculocutaneous albinism II gene, OCA2 protein, tyrosinase.

VERMIFILTRATION: A NOVAL SUSTAINABLE AND INNOVATIVE TECHNOLOGY FOR WASTE WATER TREATMENT

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ABSTRACT:

Vermifiltration is a viable technology used to treat waste water which is formulated using earthworms by their potential to enhance the permeability of the soil and increase the rate of organic matter decomposition. It is an eco-friendly and low cost technology for wastewater treatment available in and around our rural environment. Pollution originated from non point sources causing negative impact on environment and human health. Many techniques are deployed to treat waste water and prove its efficiency to treat wastewater. But it is essential to find out the treatment method which is to be low cost, easily affordable, available around our premises, consume less energy and man power and to meet the standard of effluent discharge from the treatment unit. Waste water treatment can be performed by vermifiltration which is friendly to our mother earth and sustainable technology and proved to be an affordable low cost technology. Waste water comprises many kind of contaminants originated from various sources including organic and inorganic in nature. It is also found to be contain pathogens and dissolved solids. In overview, vermifiltration technology is a prominent and viable method to solve the problems raised due to the waste water in terms of chemical contaminants and pathogenic organisms.

Index Terms: vermifiltration technology, nutrient dynamics, earthworm activity, pathogen removal, sustainability

EMERGING CONTAMINANTS- PERSPECTIVES TO SOIL , WATER AND AGRICULTURE

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ABSTRACT:

Emerging contaminants including pharmaceutical drug molecules, personal care products and microplastics observed in the environmental samples derived from various sources from municipal wastewater discharges, dumping of domestic solid wastes on land, disposal from farmlands and industrial discharges. This will cause innumerable effects and particularly endocrine disruption to all the organisms exposed to the contaminant. The treated sewage sludge is applied to the agricultural field without screening of emerging contaminants. As a result of the toxicity exposed to the organisms, antibiotic resistant bacteria disseminated in the environment due to the occurrence of antibacterial drugs in the environmental samples. It is reported that more than 200 different kinds of pharmaceuticals noted in the river water and ciprofloxacin concentration was maximum up to 6.5 mg/l. Agriculture mainly depends upon the availability of fertile soil, adequate amount of water and maintenance of agro-biodiversity. Globally the acute shortage of water severely affects agricultural productivity which provides a gateway for the usage of treated wastewater for the irrigation of agricultural soils. The Environmental Protection Agency (EPA) of the United States considered Pharmaceutical and Personal Care Products (PPCPs) as an emerging contaminant known to be an endocrine disruptor. These emerging contaminants are recently observed by many researchers and found to be toxic and detrimentally affecting the soil and aquatic environment.

Index Terms: PPCBs, antibiotics, soil pollution, water quality, agro-biodiversity

EFFECT OF DOXIFYLLINE ON KIDNEY DAMAGE INDUCED BY NITROSAMINE IN MALE RATS

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ABSTRACT:

Nitrosamines are well-known carcinogenic agents. Humans are exposed to nitrosamines in various ways, the most important of which is the diet. Doxifylline is a xanthine derivative, which is used as a drug that inhibits inflammatory factors, reduces blood viscosity, improves peripheral blood flow, and increases oxygenation of tissue. This study was designed to evaluate the effects of Doxifylline against damage induced by nitrosamine to the kidneys of rats. In this study, 48 male rats were randomly assigned to 8 groups: control normal group and nitrosamine control treated group (40 mg/kg); Doxifylline groups (25, 50, 100 mg/kg) and nitrosamine + Doxifylline treated groups (25, 50, 100 mg/kg). Treatments were administered either intraperitoneally (nitrosamine) or orally (Doxifylline) on a daily basis for 28 days. The normalized kidney weight, glomeruli characteristics, thiobarbituric acid reactive species, antioxidant capacity, kidney function indicators, and serum nitrite oxide levels were investigated. Nitrosamine administration increased kidney malondialdehyde (MDA) level, kidney weight, blood urea nitrogen (BUN), creatinine, and nitrite oxide levels and decreased significantly glomeruli number and tissue ferric reducing/antioxidant power (FRAP) level compared to the control normal group ($P < 0.05$). The Doxifylline and Doxifylline + nitrosamine treatments reduced BUN, kidney MDA level, creatinine, glomerular diameter, and nitrite oxide levels significantly at all doses and increased the glomeruli number, kidney weight, and tissue FRAP level compared to the nitrosamine control group ($P < 0.05$). It seems that Doxifylline administration improved kidney injury induced by nitrosamine in rats.

Index terms: Nitrosamine; Doxifylline

NEUROPROTECTIVE ACTIVITY OF FERULIC ACID AGAINST 3-NITROPROPIONIC ACID INDUCED HUNTINGTON'S DISEASE-LIKE SYMPTOMS IN RATS

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ABSTRACT:

Huntington's disease (HD) is an autosomal neurodegenerative disease characterized by chorea, dystonia, motor ataxia, cognitive decline and psychiatric disorders with gradual loss of nerve cells and has no existing cure for the disease. In the present study, a mitochondrial toxin, 3-nitropropionic acid (3-NP) is used to induce HD like symptoms in rats. Ferulic acid is one of the phenolic compound which was reported to have neurotrophic and neuroprotective activities. Animals were pretreated with normal saline/ Ferulic acid for 7 days. From 8th day, the treatment groups were coadministered with 3-NP (10 mg/kg, i.p) and continued to the 21st day of the treatment protocol. At the end of the study, we found that the Ferulic acid improved all the behavioral performances of 3-NP induced neurotoxic rats, significantly. Further, oxidative stress parameters (lipid peroxidation, reduced glutathione, catalase, and superoxide dismutase), succinate dehydrogenase enzyme, and neurochemical (GABA and glutamate) estimations were done in the brain homogenate. In our study, the treatment with Ferulic acid ameliorated the 3-NP induced alterations, in the biochemical and neurochemical parameter in the brain homogenate, dose-dependently. The protective role of Ferulic acid further confirmed by measuring the lesion area with the 2,3,5-triphenyltetrazolium chloride staining of the brain slices and histopathological alteration in the hippocampus (CA1 and CA3) and striatal regions of the brain. Hence, the present findings suggest that the protective role of Ferulic acid against 3-NP induced behavioral, biochemical, neurochemical, and histological alterations in rats.

Index terms: Huntington's disease, 3-nitropropionic acid, Ferulic acid, Oxidative stress, Neurochemicals Histopathology

ANTICATARACT ACTIVITY OF VANILIC ACID BY INHIBITING POLYOL PATHWAY FOR THE PREVENTION OF DIABETIC COMPLICATION

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ABSTRACT:

Background: Cataract is the opacification or optical dysfunction of the crystalline lens. Diabetes has been considered to be one of the major risk factors of cataract. Objective: The present study was designed to evaluate the anticataract activity of Vanilic acid which were subjected to prevent cataract formation in vitro on glucose-induced cataract model. Materials and Methods: Goat lenses were incubated in Krebs-Ringer bicarbonate buffer pH 7.5 (supplemented with Taxim and streptomycin) containing 55 mM glucose (cataractogenesis) with fidarestat; Vanilic acid; and FS at a concentration of 1 µg/mL, 100 µg/mL, and 10 µg/mL for 24 h at 37°C with 5% CO₂ and 95% air. Glucose-induced opacification of goat lens began 8–10 h after incubation and was complete in 24 h. Polyol (galactitol) levels in incubated lenses were estimated spectrophotometrically. Results: Cataractous lenses showed higher content of galactitol. However, lens treated with fidarestat, Vanilic acid showed lower content of galactitol. Conclusion: Vanilic acid and FS prevented the formation and progress of cataract by glucose, as evidenced by lens transparencies with photographic evaluation and lens galactitol levels.

Index terms: Aldose reductase, cataract, Vanilic acid, polyol pathway

FORMULATION AND EVALUATION OF MICROCAPSULES OF METOPROLOL SUCCINATE

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ABSTRACT:

The prepared and evaluated Metoprolol succinate was microencapsulated with stearic acid, paraffin wax, cetyl alcohol beeswax and carnauba wax by meltable dispersion technique and with ethyl cellulose and gelatine by coacervation techniques and the microcapsules were studied. Ethyl cellulose and wax/lipid microcapsules gave slow release of Metoprolol succinate over longer periods of time, whereas release was very rapid with gelatine microcapsules. In the case of ethyl cellulose microcapsules linear relationship was observed between percent coat material and T50 values. Release was diffusion controlled in the case of wax/lipid and ethyl cellulose microcapsules.

Index Terms: Microcapsules, Metoprolol succinate, ethyl cellulose, Gelatin, bees wax.

FORMULATION AND EVALUATION OF VALACYCLOVIR NIOSOMES

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ABSTRACT:

The current study aims to formulate and evaluate valacyclovir loaded niosomes for sustained release of valacyclovir. Stable valacyclovir loaded Niosomes can be prepared by hand shaking method and ether injection method with Span 80 and cholesterol in the ratio of 1:1, 2:1, and 3:1. Preformulation studies and drug excipients compatibility studies was done initially and results directed the further course of formulation. Most of the vesicles are spherical in shape, the size range of the vesicles, fall in the narrow size range of 0.5-5 μ and 0.5-2.5 μ by hand shaking method and ether injection method respectively. A high % of valacyclovir can be encapsulated in the vesicles (75-84%) prepared by hand shaking method. Drug release studies showed that the niosomal preparation was stable at refrigeration temperature (4⁰ C). The vesicles prepared by hand shaking method were found to be larger in size as compared to vesicles prepared by ether injection method. Almost constant drug release was observed in all formulations indicating zero order release pattern.

Index Terms: valacyclovir, Niosomes, Hand shaking method, Ether injection method, Osmotic shock

FORMULATION AND IN-VITRO EVALUATION OF LIPOSOMES OF ACYCLOVIR

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ABSTRACT:

The present research work was to formulate and evaluate the site specific delivery of acyclovir liposomes in order to overcome the problem of avoid the first pass effect, improve the bioavailability of drugs, reduced side effects and to produce a better therapeutic response acyclovir liposomes were formulated by an ether injection method using different concentrations of drug, and phospholipids . The formulations were evaluated from the various methods like vesicle shape, particle size, entrapment efficiency, drug content, compatibility studies and in-vitro drug release. Thin film hydration was found to be most satisfactory with respective to liposomes particle size, drug entrapment efficiency, in-vitro drug release and its release mechanism was non fickian diffusion mechanism.

Index Terms: acyclovir, Phospho lipids, Cholesterol, ethanol, Diethyl ether.

FORMULATION AND EVALUATION OF ZIDOVUDINE NIOSOMES

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ABSTRACT:

The current study aims to formulate and evaluate zidovudine loaded niosomes for sustained release of acyclovir. Stable zidovudine loaded Niosomes can be prepared by hand shaking method and ethanol injection method with Span 20 and cholesterol in the ratio of 1:1, 2:1, and 3:1. Preformulation studies and drug excipients compatibility studies was done initially and results directed the further course of formulation. Most of the vesicles are spherical in shape, the size range of the vesicles, fall in the narrow size range of 0.6-8 μ and 0.9-2.5 μ by hand shaking method and ether injection method respectively. A high % of Acyclovir can be encapsulated in the vesicles (85-94%) prepared by hand shaking method. Drug release studies showed that the niosomal preparation was stable at refrigeration temperature (4⁰ C). The vesicles prepared by hand shaking method were found to be larger in size as compared to vesicles prepared by ethanol injection method. Almost constant drug release was observed in all formulations indicating zero order release pattern.

Index Terms: Zidovudine, Niosomes, Hand shaking method, Ethanol injection method, Osmotic shock

FORMULATION AND EVALUATION OF OFLOXACIN NANOSPONGES BY SOLVENT EVAPORATION TECHNIQUE METHOD

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ABSTRACT:

Targeted drug delivery system is based on a method that delivers a certain amount of a therapeutic agent for a prolonged period of time to a targeted diseased area within the body. The purpose of present study was to formulate nanosponges of ofloxacin having bioavailability of 15% with half life 4-5 hours and protein binding 85%. Nanosponges are targeted drug delivery systems applicable to solve the bioavailability problems by releasing the drug at specific target site. In this study, nanosponges are prepared by double emulsion technique method using different ratios of HPMCK 100 and SCMC. The elevated characteristics can be estimated Particle size analysis and surface morphology of nanosponges were performed. The scanning electron microscopy of nanosponges showed that they were spherical in shape and spongy in nature. The particle size of the optimized formulations was in the range of 200-400nm and the drug entrapment efficiency was found to be in the range of 95.6 % to 98.8%. Among all the formulations prepared F6 were found to show the maximum drug release of 98.04%.

Index Terms: Nanosponges, Ofloxacin, hypercholesteremia, targeted drug delivery system, solvent evaporation method.

FORMULATION AND EVALUATION OF MICROCAPSULES OF METOPROLOL SUCCINATE

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ABSTRACT:

The prepared and evaluated Metoprolol succinate was microencapsulated with stearic acid, paraffin wax, cetyl alcohol, beeswax and carnauba wax by melttable dispersion technique and with ethyl cellulose and gelatine by coacervation techniques and the microcapsules were studied. Ethyl cellulose and wax/lipid microcapsules gave slow release of Metoprolol succinate over longer periods of time, whereas release was very rapid with gelatine microcapsules. In the case of ethyl cellulose microcapsules linear relationship was observed between percent coat material and T50 values. Release was diffusion controlled in the case of wax/lipid and ethyl cellulose microcapsules.

Index Terms: Microcapsules, Metoprolol succinate, ethyl cellulose, Gelatin, bees wax.

FORMULATION AND EVALUATION OF VALACYCLOVIR NIOSOMES

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ABSTRACT:

The current study aims to formulate and evaluate valacyclovir loaded niosomes for sustained release of valacyclovir. Stable valacyclovir loaded Niosomes can be prepared by hand shaking method and ether injection method with Span 80 and cholesterol in the ratio of 1:1, 2:1, and 3:1. Preformulation studies and drug excipients compatibility studies was done initially and results directed the further course of formulation. Most of the vesicles are spherical in shape, the size range of the vesicles, fall in the narrow size range of 0.5-5 μ and 0.5-2.5 μ by hand shaking method and ether injection method respectively. A high % of valacyclovir can be encapsulated in the vesicles (75-84%) prepared by hand shaking method. Drug release studies showed that the niosomal preparation was stable at refrigeration temperature (4⁰ C). The vesicles prepared by hand shaking method were found to be larger in size as compared to vesicles prepared by ether injection method. Almost constant drug release was observed in all formulations indicating zero order release pattern.

KEY WORDS:valacyclovir, Niosomes, Hand shaking method, Ether injection method, Osmotic shock

FORMULATION AND IN-VITRO EVALUATION OF LIPOSOMES OF ACYCLOVIR

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ABSTRACT:

The present research work was to formulate and evaluate the site specific delivery of acyclovir liposomes in order to overcome the problem of avoid the first pass effect, improve the bioavailability of drugs, reduced side effects and to produce a better therapeutic response acyclovir liposomes were formulated by an ether injection method using different concentrations of drug, and phospholipids . The formulations were evaluated from the various methods like vesicle shape, particle size, entrapment efficiency, drug content, compatibility studies and in-vitro drug release. Thin film hydration was found to be most satisfactory with respective to liposomes particle size, drug entrapment efficiency, in-vitro drug release and its release mechanism was non fickian diffusion mechanism.

Index Terms: acyclovir, Phospho lipids, Cholesterol, ethanol, Diethyl ether.

FORMULATION AND EVALUATION OF ZIDOVUDINE NIOSOMES

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ABSTRACT:

The current study aims to formulate and evaluate zidovudine loaded niosomes for sustained release of acyclovir. Stable zidovudine loaded Niosomes can be prepared by hand shaking method and ethanol injection method with Span 20 and cholesterol in the ratio of 1:1, 2:1, and 3:1. Preformulation studies and drug excipients compatibility studies was done initially and results directed the further course of formulation. Most of the vesicles are spherical in shape, the size range of the vesicles, fall in the narrow size range of 0.6-8 μ and 0.9-2.5 μ by hand shaking method and ether injection method respectively. A high % of Acyclovir can be encapsulated in the vesicles (85-94%) prepared by hand shaking method. Drug release studies showed that the niosomal preparation was stable at refrigeration temperature (4⁰ C). The vesicles prepared by hand shaking method were found to be larger in size as compared to vesicles prepared by ethanol injection method. Almost constant drug release was observed in all formulations indicating zero order release pattern.

Index Terms: Zidovudine, Niosomes, Hand shaking method, Ethanol injection method, Osmotic shock

FORMULATION AND EVALUATION OF OFLOXACIN NANOSPONGES BY SOLVENT EVAPORATION TECHNIQUE METHOD

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ABSTRACT:

Targeted drug delivery system is based on a method that delivers a certain amount of a therapeutic agent for a prolonged period of time to a targeted diseased area within the body. The purpose of present study was to formulate nanosponges of ofloxacin having bioavailability of 15% with half life 4-5 hours and protein binding 85%. Nanosponges are targeted drug delivery systems applicable to solve the bioavailability problems by releasing the drug at specific target site. In this study, nanosponges are prepared by double emulsion technique method using different ratios of HPMCK 100 and SCMC. The elevated characteristics can be estimated Particle size analysis and surface morphology of nanosponges were performed. The scanning electron microscopy of nanosponges showed that they were spherical in shape and spongy in nature. The particle size of the optimized formulations was in the range of 200-400nm and the drug entrapment efficiency was found to be in the range of 95.6 % to 98.8%. Among all the formulations prepared F6 were found to show the maximum drug release of 98.04%.

Index Terms: Nanosponges, Ofloxacin, hypercholesteremia, targeted drug delivery system, solvent evaporation method.

ANTIOXIDANT AND ANTIDIABETIC POTENTIAL OF CINNAMOMUM CASSIA METHANOLOIC EXTRACT

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ABSTRACT:

Cinnamomum cassia or *Chinese cinnamon* is one of the fundamental herbs in traditional Chinese medicine. *C. cassia* is used as astringent, antiseptic, and used for the treatment of metabolic disorders. The antioxidant and antidiabetic effects of its extracts are unclear. Hence, the present study is planned to investigate the antioxidant and antidiabetic effects of methanolic extracts barks of *C. cassia*. Bark of *C. cassia* was extracted with methanol its antioxidant activity was studied using 2,2-diphenyl-1-picrylhydrazyl (DPPH) and 2,2-azino-bis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS) free radical scavenging assays. Acute toxic effect of methanolic extract of *C. cassia* (MECC) carried out as OECD guidelines. MECC was studied for its antidiabetic effect using streptozotocin (STZ)-induced diabetic rats. In both DPPH and ABTS free radical scavenging assay, methanolic extracts exhibited free radical scavenging activity. The antidiabetic activity of MECC was carried out at the dose levels of 200, 400, and 600 mg/kg. MECC showed antidiabetic activity after two week of the treatment. At the end of the study, diabetic animals showed significant increases in the levels of total cholesterol (TC), very-low-density lipoprotein, and TC/high-density lipoprotein ratio compare with that of normal control and MECC prevented the STZ-induced hyperlipidemia. In the histopathological analysis, sections from the liver, pancreas, and kidney of the diabetic animals and the animals treated with MECC 600 mg/kg showed mid-to-moderate toxic effects. The MECC exhibited significant antioxidant and antidiabetic activities.

Index Terms: *Cinnamomum cassia*, *diabetes*, *streptozotocin*, *Sprague-Dawley rats*

COMPARATIVE DEGRADATION STUDIES OF COMMERCIAL FORMULATIONS OF ATORVASTATIN USING UV SPECTROSCOPY

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ABSTRACT:

Statins are HMG Co-A reductase inhibitors, used to lower the blood cholesterol. The bioavailability of these drugs is very poor as they are sensitive to physical and chemical factors. In order to improve the pharmacokinetic properties of drug there are several formulations being developed. In the present study, we conducted a comparative degradation study for four new commercially available brands (tablet dosage forms) in the local market. Analysis was carried out based on stress degradation studies as per ICH guidelines. Methanol was used as a diluent for preparation of test solutions. The absorption maximum for ATR was obtained at 270 nm. The selected brands i.e., Astin, Atorec, Atorvasia and Atrorvin with 20 mg of Atorvastatin (ATR) tablets were subjected to stress degradation studies. After exposing to stress conditions, the amount of ATR was quantified by standard protocols. The results found that all the brands were degraded up to some extent (22-26 %) at acid and thermal (25-28 %) stress conditions. The results found were accurate and precise as well as reproducible and economical and can be successfully used for degradation studies of different dosage forms.

Index Terms: Degradation, Atorvastatin, ICH, UV- spectroscopy, Accuracy.

PHYTOCHEMICAL PROFILE SCREENING AND "IN-VITRO" ANTIOXIDANT ACTIVITY OF ETHANOLIC FLOWER EXTRACTS OF PUNICA GRANATUM

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ABSTRACT:

The objective of the present study was to evaluate the phytochemical constituents and antioxidant activity of ethanolic extract of dried flower of medicinally important herb punicagranatum. Qualitative analysis of phytochemical constituents' Viz. tannins, saponins, flavonoids, steroids, alkaloids, quinines, coumarins, terpenoids, lignins and sugars and quantitative analysis of carbohydrates, protein and phenol was performed by the well-known tests protocol available in the literature. Antioxidant activity was studied through DPPH radical scavenging assay, Reducing power assay, ABTS scavenging assay and Nitric oxide radical scavenging assay. The results suggest that punicagranatum promising antioxidant activity and could serve as potential source of natural antioxidants.

ANTIOXIDANT, ANTIBACTERIAL AND ANTI-PROLIFERATIVE ACTIVITY AND PHYTOCHEMICAL ANALYSIS OF SELECTED MEDICINAL PLANTS FROM COASTAL REGIONS IN ANDHRAPRADESH

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ABSTRACT:

Andhra Pradesh coastal region is endowed with rich biodiversity of medicinal plants which are widely used in various traditional medicinal systems like Ayurveda which are potential sources of bioactive constituents with effective and safer drugs. The present study is to evaluate the antibacterial, antioxidant and antiproliferative activity of traditional medicinal plants *Biophytumsensitivum* (L.) DC, *Curculigoorchioides* Gaertn. and *Cynodondactylon* (L.) Pers. The petroleum ether extract of *Curculigoorchioides* showed significant antibacterial activity against pathogenic strains of bacteria. Among the other extracts methanolic extract of *Curculigoorchioides* showed higher phenolic and flavonoid content and significant DPPH scavenging and reducing power activity. The antiproliferative activity was tested against Hep G2 (hepatocellular liver carcinoma) in which methanolic extract of *Biophytumsensitivum* and *Curculigoorchioides* showed strong anticancer activity with an IC₅₀ 108.72 and 127.12 µg/ml respectively. Our study confirmed the ethanobotanical and traditional medicinal usage of the three medicinal plants *Biophytumsensitivum*, *Curculigoorchioides* and *Cynodondactylon*.

HEPATOPROTECTIVE ACTIVITY OF ARECA CATECHU FLOWER EXTRACT AGAINST PARACETAMOL INDUCED HEPATOTOXICITY IN RATS

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ABSTRACT:

Areca catechu is an important medicinal plant and popularly known as black weed. *Areca catechu* belongs to Arecales family and very important indigenous medicinal plant. The earlier study reported that hepatoprotective activity leaves of *Arecacatechu*, hence there is no report on hepatoprotective activity of flower of *Areca catechu* and the hepatoprotective phytoconstituents like lupeol, β -carotene, β -sitosterol and rutin are already reported in this plant material. Therefore this current research is aimed to evaluate the hepatoprotective effect of flowers of *Areca catechu*. The paracetamol induced rat model was used to evaluate the hepatoprotective activity and Silymarin was used for standard. Treatment with ethyl acetate and chloroform extracts of *Areca catechu* to the paracetamol induced liver toxic rats shows the significant reduction of SGOT, SGPT, ALP, total cholesterol, triglycerides, urea and uric acid levels. However the CAT, GSH, GPx and SOD levels were significant increase in ethyl acetate and chloroform extracts of *Areca catechu* treated paracetamol induced liver toxic rats. Results of current research concluded that the hepatoprotective activity of *Areca catechu* through antioxidant mechanism.

Index Terms: Paracetamol, Silymarin, Hepatoprotective, SGOT, SGPT, ALP, CAT, GSH

IMMUNO MODULATORY ACTIVITY OF HIBISCUS CANNABINUS SEEDS EXTRACT

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ABSTRACT:

Immunostimulants are the substances consisting of drugs and nutrients which are stimulate the immune system by inducing or increasing activity of any of its components. The aim of the proposed study was to investigate the effect of the *Hibiscus cannabinus seeds* as immunostimulant in the experimental animals using *in-vivo* and *in-vitro* procedures. The seeds of *Hibiscus cannabinus* are subjected for ethanol extraction, these extracts were comparatively evaluated for the effect on immune system in experimental animals. The extracts were administered at ethanolic (200,400mg/kg, *p.o*). The effect of extracts was evaluated using models i.e., neutrophil adhesion test, immunoprophylactic effect. The neutrophil adhesion test was conducted to determine the effect on neutrophil stimulation and immunoprophylactic effect was also carried out to determine the specific immunity by challenge with *Escherichia coli* 0.5ml per 100gm dose to check the survival of the animals against invading pathogens. The ethanolic extracts of *Hibiscus cannabinus* are reduced the rate of mortality and decreased the abdominal peritonitis in the immunoprophylactic effect. The results of the present study suggests that ethanolic (200,400mg/kg, *p.o*) are significantly decreased the delayed type hypersensitivity response in rat foot paw and significantly increase the adhesion of neutrophil to nylon fibers in the neutrophil adhesion test. The above observations are confirmed that Ethanolic seed extracts of *Hibiscus cannabinus* are possessed the immunostimulatory effect

Index Terms: *Immunostimulants, Hibiscus cannabinus, neutrophil adhesion, Aqueous extract, Ethanolic extract.*

FORMULATION AND EVALUATION OF METFORMIN HYDROCHLORIDE MATRIX TABLETS BY USING NATURAL GUM AS RELEASE MODIFIER

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ABSTRACT:

The main aim of present study is to prepare and evaluate Metformin HCl tablets using natural polymer Xanthan gum as release retarding agent by wet granulation method for effective treatment of type II Diabetes mellitus. Preformulation studies including drug excipients compatibility was conducted. Formulations (F1- F6) of Metformin HCl tablets with increasing concentrations of xanthane for sustained release were prepared by wet granulation method using natural polymers like Xanthane gum and were evaluated for tests such as weight variation, thickness, hardness, and drug content uniformity and *in vitro* drug release. The *in vitro* dissolution study was carried out for 12 hours using USP paddle apparatus in hydrochloride (0.1N) and phosphate buffer (pH 6.8) as dissolution media. The rate of drug release from a dosage form is characterized by mean dissolution time and indicates the drug release retarding efficiency of polymer. Based on the *in vitro* dissolution data F2 was selected as the best formulation for Metformin where the drug release was retarded up to 12 hours with 94.87 % drug release which follows Zero order and Non-Fickian mechanism.

Index Terms: Sustain release, Metformin HCl, Xanthane Gum, Wet granulation, and Release kinetics.

DESIGN, OPTIMIZATION & INVITRO EVALUATION OF GASTRORETENTIVE FLOATING TABLETS OF NIFEDIPINE

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ABSTRACT:

The present focus is on the development of sustained release formulations due to its inherent boons. There are several advantages of sustained release drug delivery over conventional dosage forms like improved patient compliance, reduction in fluctuation and increase safety margin of potent drug. The present study was aimed to prepare a floating drug delivery system to design a controlled release oral dosage form of Nifedipine. This helps to overcome the demerit of limited residence time of the drug in the gastrointestinal track and hence to increase the duration of release. The floating delivery system of Nifedipine by direct compression method with hydroxyl propyl methyl cellulose was prepared and evaluated for different parameters such as weight uniformity, thickness, hardness, friability, swelling index, buoyancy studies and *In vitro* release studies. The *in vitro* dissolution study was carried out for 12 hours using USP(Type-II) paddle apparatus in hydrochloride (0.1N) as dissolution media. Mean dissolution time was used to characterize drug release rate from a dosage form which indicates the retarding efficiency of polymer. Based on the *in vitro* dissolution data, formulation F6 was selected as the best formulation from Nifedipine formulations (F1 – F6) respectively, the drug was retarding up to 12 hours with 82.87 % and follows first order release kinetics. The optimized formulation undergoes stability study at 25°C / 60%RH, 30°C / 65%RH, 40°C / 75%RH. There was a slight change in physical characteristics, buoyancy study and dissolution study.

Index Terms: Nifedipine, HPMC, Direct Compression Method, Floating Matrix Tablet, stability

FORMULATION AND EVALUATION OF SOLID DISPERSION OF ACECLOFENAC

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ABSTRACT:

The present study is aimed to improving the dissolution of poorly water-soluble drug Aceclofenac. It is very slightly soluble in water and hence the orally administered drug shows less bioavailability. In order to enhance the bioavailability, it is necessary to improve its solubility, hence the solid dispersion technique was adopted to enhance solubility. The solid dispersions were prepared by using fusion and solvent evaporation methods with different proportions of hydrophilic carriers like Urea and Mannitol. The dissolution rate studies were performed in simulated intestinal fluid. The solid dispersions gave faster dissolution rate when compared to corresponding pure drug.

Index Terms: Bioavailability, Hydrophilic Carriers, Solid Dispersion and Dissolution.

EVALUATION OF ANTI-INFLAMMATORY ACTIVITY OF POLYHERBAL FORMULATION

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ABSTRACT:

The present investigation was carried out to evaluate the anti-inflammatory activity of polyherbal formulation (PHF) of aqueous extracts of *Mimusopselengi*, *Indigoferazollingeriana*, *Dilleniaindica*. Swiss albino mice of either sex and Wistar strain of albino rats of either sex were used for the study. In vitro anti-inflammatory activity of PHF was studied by Inhibition of albumin denaturation, Antiproteinase action, Membrane Stabilization Action, Heat induced haemolysis, Hypotonicity-induced haemolysis, Antilipoxygenase activity. Carrageenan induced Paw edema and Hot Plate Tests were used for in vivo study. Aspirin (100ug/ml), Diclofenac (100ug/ml), Indomethacin (100ug/ml) were used as standards. PHF at 250, 500, and 1000mg/kg showed significant ($p < 0.05$) inhibition of protein denaturation. A significant ($p < 0.05$) inhibition on antiproteinase action was observed in a dose dependent manner. PHF exhibited significant ($p < 0.05$) membrane stabilizing action in a dose dependent manner. PHF offered significant protection ($p < 0.05$) for the erythrocyte membrane against lysis, induced by heat in a dose dependent manner. PHF offered protection significantly for the erythrocyte membrane against lysis induced by hypotonic solution. PHF exhibited significant ($p < 0.05$) anti-lipoxygenase inhibition. Edema suppressant effect of PHF treated group was found to be significant ($p < 0.05$) on both phases of inflammation when compared to control. Conclusion: The study revealed that PHF has promising features for suppressing inflammation.

Index Terms : Anti-inflammatory, Polyherbal Formulation, Edema, Hypotonicity

ANTIUROLITHIATIC ACTIVITY OF *DILENIA INDICA* HYDROALCOHOLIC FLOWER EXTRACT BY NUCLEATION AND AGGREGATION ASSAY

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ABSTRACT:

A kidney stone, also known as a renal calculus is a solid concretion or crystal aggregation formed in the kidneys from dietary minerals in the urine. Urolithiasis is a complex process that occurs from series of several physicochemical events including super-saturation, nucleation, growth, aggregation and retention within the kidneys. A well-known traditional herb *Dileniaindica* is widely used in India for the management of different ailments including urolithiasis. *Pashanabheda* is used as an antiurolithiatic in Ayurveda. In the present study, flowers of *Dileniaindica* were selected for screening *in vitro* antiurolithiatic potentials, as literature supports that flowers have highest quantity of natural constituents when compared with the other parts of the plant. Hydroalcoholic (80-20%) extract of *Dileniaindica* flowers was prepared and phytochemical investigation was done. Finally *in vitro* antiurolithiatic activity was screened by nucleation and aggregation assay. In the aggregation assay gradually decrease in the CaOx crystal nucleation as well as growth was observed by light microscopy. The findings of the nucleation assay indicate that phytoconstituents inhibited the crystallization of CaOx in solution. There were less and smaller particles with increasing concentration of the phytoconstituents. The increasing concentrations of extract (100,200,300,400 and 500 µg/ml) inhibited the CaOx crystal growth. The hydroalcoholic flower extract of *L.camarah* has shown antiurolithiatic effect by significantly reducing the CaOx crystal growth.

Index Terms: antiurolithiatic activity, Hydroalcoholic extract, aggregation assay

PHYTOCHEMICAL SCREENING AND INVITRO ANTIUROLITHIATIC ACTIVITY OF ICOSANDRA AQUEOUS LEAF EXTRACT

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ABSTRACT:

Pashanabheda is used as antiurolithiatic in Ayurveda. In the present study, *Punicagranatum* is used for screening *in-vitro* antiurolithiatic potentials. Screening of *in-vitro* antiurolithiatic potentials of aqueous leaf extract of *Punicagranatum*. The extract was subjected to Preliminary phytochemical analysis. *In vitro* antiurolithiatic activity was screened by nucleation and aggregation assay in which the formation and growth of CaOx crystals were quantified. The extract exhibited inhibitory action in both nucleation and aggregation assays to significant level. In the aggregation assay gradually decrease in the CaOx crystal nucleation as well as growth was observed by light microscopy. The findings of the nucleation assay indicate that the extract inhibited the crystallization of CaOx in solution. There were less and smaller particles with increasing concentration of the extract. The increasing concentrations of extract (100, 200, 300, 400 and 500 µg/ml) inhibited the CaOx crystal growth. *Punicagranatum* extract demonstrated slightly better results compared to Cystone standard solution to inhibit the formation of calcium oxalate dihydrate crystals in the nucleation assay. The aqueous leaf extract of *Punicagranatum* has shown antiurolithiatic effect by significantly reducing the size and growth of calculi in the *in vitro* assays.

Index Terms : antiurolithiatic activity, aggregation assay, nucleation assay.

ANTI-PSORIATIC AND PHYTOCHEMICAL EVALUATION OF MELISSA OFFICINALIS EXTRACTS

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ABSTRACT:

The plant *Melissaofficinalis* (Lamiaceae) traditionally claimed to be useful in the treatment of cutaneous affections such as scabies, psoriasis, ringworm, guineaworm, eczema and herpetic diseases. Oil prepared by boiling the ground bark in coconut oil is applied externally in psoriasis and scabies. Hence, the plant *Melissa officinalis* has been chosen to establish scientific data for its traditional claim as anti- psoriatic. This is firstever study on *Melissa officinalis* extract. Phytochemical investigation revealed the presence of carbohydrates, glycosides, tannins, flavonoids, triterpenoids, phytosterols, proteins and lipids/fixed oils in the bark of *Melissa officinalis*. Thin layer chromatography studies supported their presence. Chemical tests performed, TLC studies carried out and UV & IR spectral data indicates that the isolated compounds MoF-1, MoF-2 might be flavonoids and MoS-2 might be a sterols. MoF-1, MoF-2 & MoS-2 were isolated from the bark powder and an attempt was made to characterize them by physical, chemical and spectral data. Screening for anti-psoriatic activity was carried out by topical application of different extracts & isolated compounds (MoF-1, MoF-2 & MoS-2) of *Melissaofficinalis* in the form of a cream using the Perry's scientific mouse tail model. Successive pet-ether extract showed maximum antipsoriatic activity (increased orthokeratotic region by 32%) amongst the extracts tested the compound MoF2 exhibited 52% increase in the same. From the above data, it is can be said that, the plant *Melissa officinalis* is promising for further investigations to prove its anti-psoriatic activity

Index Terms: *Melissa officinalis*, Psoriasis, Phytochemical

ANTIPYRETIC ACTIVITY OF METHANOLIC EXTRACT OF ARCTOMECON HUMILIS

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ABSTRACT:

In the present study, the methanolic extract of whole plant of *Arctomeconhumilis* was investigated for antipyretic activity in rats using Brewer's yeast induced Pyrexia model as described by Loux et al (1972). The plants of *Arctomeconhumilis* were collected from Kalakad foot hills and cut into small pieces and shade dried. The dried powdered plants (100 gm) were extracted in a Soxhlet apparatus by using methanol. Albino rats weighing (150-200g) were taken for the experiment divided into four groups of four animals each. Group 1 was treated as positive control and received 10 ml of normal saline. Group 2 served as negative control which received NSAID (non steroidal anti-inflammatory drugs) paracetamol 10 mg/kg/ml suspended in 1% DMSO which served as standard anti-pyretic agent. Group 3 and 4 were treated with 200 mg/kg/ml (low dose) and 400 mg/kg/ml (high dose) of methanol extract of the whole plant of *Arctomeconhumilis* suspended in DMSO respectively. The antipyretic activity studies revealed that, the methanolic extract of the plant possesses a significant antipyretic effect against elevated rectal temperature induced by yeast suspension in rats. The effectiveness of antipyretic activity was observed at doses of 200 mg/kg and 400 mg/kg of the plant extracts and the effects were comparable with the standard drug paracetamol. The antipyretic effects increased with time, up to 4 h and it was found to be statistically significant when compared with the control group. The results showed that the *Arctomeconhumilis* at dose 400 mg/kg at 1,2,3 and 4th h have significant antipyretic activity ($P < 0.01$) and can be used as antipyretic drugs in fever.

Index Terms: *Arctomeconhumilis*, Antipyretic, Brewer's yeast, Paracetamol

ANTIOXIDANT ACTIVITY OF AQUEOUS AND ETHANOL EXTRACTS OF ARCTOTIS GRANDIS

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ABSTRACT:

The purpose of this study was to determine the antioxidant and antiradical activities in aqueous and ethanol extracts of *Arctotisgrandis*. In this study, vitamin C, antioxidant and antiradical properties were determined using spectrophotometer. The results are compared with the reference antioxidants such as trolox, α -tocopherol and BHT. The results of this study showed that *Arctotisgrandis* has a high antioxidant capacity. *Arctotisgrandis* is thought to be used as additives for food products and pharmaceutical industries with appropriate antioxidant properties and an antioxidant in future studies of experimental animal models, against free radicals generated in response to oxidative stress.

Index Terms: *Arctotisgrandis*, Antioxidant, α -tocopherol

A STABILITY INDICATING RP-HPLC METHOD FOR DETERMINATION OF AZILSARTAN MEDOXOMIL IN THEIR PHARMACEUTICAL DOSAGE FORMS

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ABSTRACT:

Stability-indicating, reverse-phase high-performance liquid chromatography (RP-HPLC) was developed and validated for the determination of azilsartanmedoxomil from pharmaceutical dosage form. In RP-HPLC, separation was performed with Hypersil C-18 column (250 mm X 4.6 mm, 5 μ m), using mobile phase methanol: acetonitrile: 1% v/v formic acid (88:8:4 v/v/v) at a flow rate of 0.8 ml/min. The analyte was detected at 265 nm with 5.8 mins retention time. The linearity of the method was obtained over a concentration range of 5 - 25 μ g/ml with correlation coefficient of 0.998. The method found specific, accurate and precise as per validation results. In addition, stress degradation study was also conducted as per ICH guidelines. Wherein degraded product peaks were well resolved from the analyte peak in terms of their retention time and retardation factor in RP-HPLC. A peak for degradation product was obtained with retention time of 4.2 mins in acid degradation conditions. The proposed method can be applied for the routine analysis for quality control of azilsartanmedoxomil in pharmaceutical formulations.

Index Terms: Azilsartanmedoxomil, stability, RP-HPLC, accuracy and validation.

FORMULATION AND DEVELOPMENT OF SUSTAINED RELEASE TABLETS OF VALSARTAN SODIUM

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ABSTRACT:

The objective of the present study was to develop a sustained release tablets of Valsartan Sodium an anti hypertensive drug. The sustained release tablets were prepared by wet granulation and formulated using different drug and polymer ratios, formulations such as F1 to F9. Polymers like Hydroxypropyl methylcellulose (HPMC), sodium CMC and Eudragit were used. Compatibility of the drug with various excipients was studied. The compressed tablets were evaluated and showed compliance with Pharmacopoeial limits. The optimized formulation (F5) on the basis of acceptable tablet properties and in vitro drug release. The resulting formulation produced tablets with optimum hardness, weight uniformity and friability. All tablets exhibited gradual and near completion sustained release for Valsartan Sodium, and 98.45% released at the end of 12h. The results of dissolution studies indicated that formulation F5 the most successful of the study, exhibited drug release pattern very close to theoretical release profile.

Keywords :Hydroxypropyl methylcellulose (HPMC), sodium CMC and Eudragit, Valsartan.

ANALYTICAL METHOD DEVELOPMENT AND VALIDATION FOR SIMULTANEOUS DETERMINATION OF SITAGLIPTIN AND METFORMIN BY RP-HPLC METHOD

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ABSTRACT:

A simple, accurate, specific and reliable RP-HPLC method for the simultaneous estimation of Sitagliptin and Metformin Hydrochloride in Pharmaceutical dosage form was developed and validated according to currently accepted ICH guidelines of analytical method validation. In the present method, HPLC system (Waters) consisting of quaternary gradient pump, auto sampler, column, oven, and PDA detector was employed for analysis. Chromatographic data was acquired using Empower 3 software (C18) Zorbax SB C18 column (4.6×150mm, 3.5µm) was used as stationary phase. 1-Heptane sulfonic acid sodium salt anhydrous, trimethylamine amine solution, pH adjusted to 3.0±0.05 (with dilute orthophosphoric acid solution) and Methanol in the ratio of 70:30%v/v was used as mobile phase and was filtered before use, through 0.45 µ membrane filter. A constant flow of 1.0 ml/min was maintained throughout the analysis. Detection was carried out using PDA detector. The degassed mixture of 0.01N Hydrochloric acid :Acetonitrile in the ratio of 90:10% v/v is used as diluent. Sitagliptin and Metformin Hydrochloride were eluted at 2.718 and 1.925 min. The detection was carried out at a wavelength 245nm. The method was validated for system suitability, linearity, accuracy, precision and robustness of sample solution. The linear ranges for Metformin Hydrochloride and Sitagliptin were 20-120µg/mL, 2-12µg/mL respectively with good recoveries i.e. 99.4% to 101.35%.

Index Terms: Metformin Hydrochloride, Sitagliptin, RP-HPLC.

TELMESARTAN LOADED SOLID LIPID NANOPARTICLES: DEVELOPMENT, CHARACTERIZATION, AND IN VITRO AND EX VIVO EVALUATION

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ABSTRACT:

Telmisartan is an antihypertensive drug with poor oral entrapment (PDE), DSC Scans, XRD and TEM analysis. In vitro bioavailability ranging from 10-35% because of poor solubility, dissolution and most importantly, extensive first pass hepatic metabolism. The present study deals with the development and characterization of Telmisartan-loaded solid lipid nanoparticles (TSLNs) to enhance the solubility, bypass the first pass hepatic metabolism, and enhance the lymphatic absorption leading to improved bioavailability. TSLNs were developed using glycerylbehenate as drug release studies were performed in 0.067 M phosphate buffer of pH 6.8 using dialysis diffusion bag method. Ex vivo drug release studies were also performed for both TSLNs and Telmisartan suspension in stomach and intestine. The optimized formulation of having the 80 mg lipid, 10 mg drug and 250 mg surfactant was found to have particle size distribution of 142.5 ± 1.859 nm, zeta potential of -14.3 ± 0.384 mV, and $84.59 \pm 0.328\%$ drug entrapment. Based on these results, it is concluded that SLNs show promise for improving the oral bioavailability of Telmisartan. the lipid and Poloxamer 407 (Pluronic F 127) as the surfactant by the solvent injection method. TSLNs were characterized for mean particle Size (MPS), zeta potential, percentage drug.

Index Terms: Telmisartan; poor solubility; oral bioavailability; first-pass metabolism; lymphatic absorption; solvent injection method.

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