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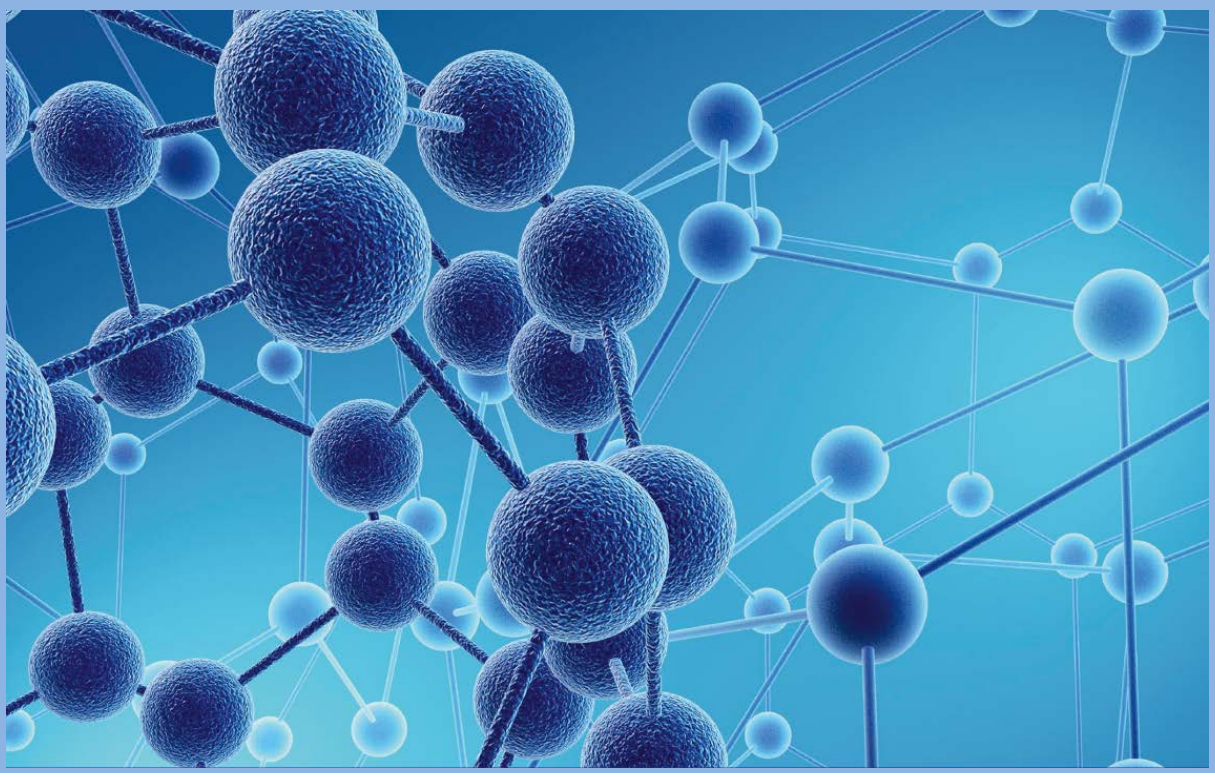

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Bioprospecting- Search for Natural Bioactive Molecules

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PLENARY LECTURE

The Indian subcontinent is rich in biodiversity and home to a variety of plants and animal species. More than 15,000 species of plants have been recorded from India. Plants have been the source of food and medicine for mankind even before the dawn of civilization. Ayurveda, the Indian system of medicine is the first written document of the use of plants for curing various ailments. It is believed that a very small fraction of the plant species have been used as source of bioactive molecules for their use as pharmaceuticals, pesticides and cosmetics. More than 70% of the currently prescribed drugs are derived from natural molecules. Recently, there is a surge of interest in the search for promising bioactive molecules the food and medicinal plants. We have been investigating plants as potential sources of novel therapeutic molecules. We have discovered several bioactive molecules from fungi and plants. Sporotricolone is a novel bioactive molecule isolated from a fungus from our laboratory which could be a candidate for either a drug for Alzhimer's disease or a novel biopesticide (US patent 2006). We have also isolated several bioactive compounds from the edible roots of *Decalepis hamiltonii* which show free-radical scavenging properties and constitute novel nutraceutical molecules with promising health promoting potential. It is for the first time that an edible root form India has been shown to contain an array of bioactive compounds that could be exploited for better health.

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Carbon based Nanomaterials - Processing and Applications

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PLENARY LECTURE

The last few years have witnessed the discovery, development and large-scale manufacturing and production of novel nanomaterials, some of them promise exciting energy and biological related applications. One-dimensional Carbon nanotubes (CNTs) and two-dimensional graphene have outstanding properties, which have sparked an abundance of research since their discovery. These remarkable arrays of features have potential applications as biomedical materials and devices, biosensors, drug and vaccine delivery vehicles and novel biomaterials. In addition, they promise a wide range of energy applications such as catalyst supports in fuel cells, electronic devices, field emitters, gas sensors, gas-storage media, supercapacitors, nanofluids and molecular wires for next generation electronic devices. Use of nanomaterials, nanoparticles and nanocomposites for biomedical purposes constitutes nanomedicine and CNTs have been poised to revolutionalise a variety of biomedical applications. The *in vivo* toxicological and pharmacological studies undertaken so far indicate that funtionalised carbon nanotubes can be developed as nanomedicines. Functionalisation renders the surface of carbon nanotubes water soluble, compatible with biological fluids and leads to their rapid excretion through the renal route and minimising unwanted tissue accumulation. Many approaches to nanomedicine being pursued today are already close enough to fruition that their subsequent incorporation into valuable medical diagnostics is highly likely to occur very soon. In the longer term,

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nanorobots may join the medical giving physicians the most potent tools imaginable to conquer human disease.

The present talk offers a concise and focused review of the state-of-the-art in the synthesis of different types of nanomaterials and their properties. In addition, the processing of Carbon nanotubes and graphene and their applications will be addressed taking into consideration of the various key issues for the development of environmental, energy materials and nanomedicines.

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Microbial Diagnosis – An Update

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PLENARY LECTURE

Microbial diagnosis requires the joint effort of the clinician and Medical microbiologist. Conventional methods of diagnosis, such as Gram's staining to culture methods, are widely used all over the world because they are sensitive and inexpensive. The microbiology laboratory offers advice concerning the differential diagnosis, choice of specimens, as well as the optimal stains and cultures to facilitate diagnosis. Additionally, the rapid interpretation of Gram-stained smears provides useful, occasionally lifesaving, information relative to the etiologic diagnosis and empiric antimicrobial therapy. The microbiology laboratory also provides further interpretation of culture and antimicrobial testing results that allow the clinical service to focus on the most critical data. The accurate diagnosis of infection is essential for effective treatment, high quality surveillance, control of outbreaks and epidemics and to successful prevention of infectious diseases.

This talk would throw light on over-view of the diagnosis starting from normal Microbiological laboratory techniques to the recent advances in Diagnostic Microbiology. The conventional method of diagnosis tends to be labor and resource intensive and require considerable expertise. However these isolates also require further characterization by molecular techniques to confirm identification.

Serological diagnosis have also played a vital role in the diagnosis of infectious diseases where culturing of the micro organisms are difficult. Immunochromatographic methods (Rapid tests like tridot, Pregnancy tests, HBsAg tests) have replaced the ELISA systems which is time consuming. Western

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Blotting method is used as a confirmatory test for HIV has helped the clinicians for diagnosis of the infections.

Molecular Microbiology has emerged as the leading field in clinical microbiology laboratory and created new opportunities for laboratory diagnosis to increase patient care. It helps in disease prognosis and monitoring the response to treatment. Even though cultures have long been the 'Gold standard' for infectious diseases, now it has been replaced by molecular methods due to the rapid and accurate diagnosis at the genome level. Hepatitis C, Enteroviral meningitis, Herpes simplex viruses, Chlamydia trachomatis are some examples where molecular methods are the new gold standards. Molecular methods are more advantageous in situations where conventional methods are slow, insensitive, expensive or not available.

Molecular methods range from Southern blot, Hybridization, etc to Polymerase chain reaction (PCR) and sequencing. Recent Developments in PCR has come up with real time PCR and Multiplex PCR which provides rapid diagnosis. These techniques have wide application for the detection of bacteria, fungi and toxins from patient samples and identification from culture. This is particularly useful for organisms that are difficult to cultivate, like Mycobacterium tuberculosis and Chlamydia trachomatis.

Molecular microbiological research is now entering into an era of 'big science' called as "Micro array". The classical Southern and Northern blotting approaches for the detection of specific DNA and mRNA species provided the technological basis for microarray hybridization with fluorescently labelled cDNA. The idea of depositing multiple DNA spots representing different genes onto a solid surface with the help of robotics to achieve high spotting densities of DNA on glass slides was innovative and facilitates the construction of microarrays containing up to 50000 genes on a single microscope slide. This allows a single hybridization to be performed against multiple replicates of a single bacterial genome, or against copies of several unrelated genomes on a single glass slide. The development that has facilitated the reproducible comparison of gene expression between two samples, and hence between experiments, is dual fluorescent labeling. Simultaneous hybridization of two cDNA populations labelled with the fluorescent dyes Cy3 and Cy5 allows accurate assessment of relative levels of gene expression.

Even though microarray technology is in its infancy, this would prove to be an useful and productive tool in future for the diagnosis of infectious diseases.

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Preclinical Toxicology - Its Role in New Drug Discovery

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PLENARY LECTURE

Toxicology is the study of the adverse effects of chemical, physical or biological agents on living organisms. It is a multi-disciplinary field that combines various disciplines of biology and chemistry in order to study poisons and their effect on biological systems. Toxicological studies are employed in the field of New Drug Discovery to understand the toxicity of the new drug well enough to make a judgment that it is safe to initiate clinical trials in humans. Principles of toxicology are integral to the proper use of science in risk assessment, where quantitative estimates are made of the potential effects on human health and environmental significance of various types of chemical exposure.

Toxicological evaluations are made in drugs, to determine, if the proposed clinical protocols in man are reasonably safe to initiate, to estimate a "safe" starting dose & parameters for monitoring during phase I clinical trials of new drugs, identify organ(s) toxicities and reversibility, guide dosing regimens and escalation schemes, kinetics and to mimic the duration and intended route of administration in humans. Different type of studies varying from acute, sub acute to chronic exposure of the new drug to at least two different species of animals mimicking the intended route of administration in human, are needed to evaluate the toxicity of a drug. These regulatory toxicity studies are required to be carried out for deciding, on the basis of data from descriptive and mechanistic data, whether a drug or chemical poses a sufficiently low risk to be marketed.

Acute systemic toxicity testing is the estimation of the human hazard potential of a substance by determining its systemic toxicity in a test system (rodents) following an acute exposure. Its assessment

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has traditionally been based on the median lethal dose (LD50) value - an estimate of the dose of a test substance that kills 50% of the test animals. The Globally Harmonized System (GHS), which is implemented in 2008, defines acute toxicity as "those adverse effects occurring following administration of a single dose of a substance, or multiple doses given within 24 hours, or an inhalation exposure of 4 hours.

Sub acute/Sub Chronic toxicity studies predict any cumulative effect of the drug. Compound under test is given daily in 3 dose levels for 2 – 4 weeks (Sub acute), for 90 days (Sub chronic) or more than 90 days (Chronic). Animals are observed for different parameters: physiological, clinical and chemical tests, behaviour, CNS & autonomic profiles. At the end of the test, animals are subjected to the following tests & then are sacrificed. Hematological studies include parameters such as hemoglobin, RBCs, WBCs, platelets etc. Clinical chemistry studies targeting various systems such as liver function, kidney function, general metabolism etc., are carried out from serum or plasma. Histopathological studies for different organs (spinal cord, heart, kidney etc) are also carried out.

In case of toxicity studies that cover the entire life span of the animal (chronic), the same previous procedures are applied but treatment with chemicals starts after weaning of offsprings (litters). Administration of the chemical is continued till death of animals. When animals die spontaneously, the same parameters as mentioned above are determined.

Reproductive toxicity studies are carried out on males and female to identify toxic effects such as decreased libido and impotence, infertility, interrupted pregnancy, (abortion, fetal death, or premature delivery), infant death or childhood morbidity, altered sex ratio and multiple births, chromosome abnormalities and childhood cancer. Developmental Toxicity (toxicity on developing embryo or fetus) helps to identify embryolethality (Failure to conceive, spontaneous abortion), embryotoxicity (Growth retardation or delayed growth of specific organ systems), teratogenicity (Irreversible conditions that leave permanent birth defects in live offspring).

Mutagenic and carcinogenic studies help in evaluating carcinogenicity which, is a complex multistage process of abnormal cell growth and differentiation which can lead to cancer. The initial neoplastic transformation results from the mutation of the cellular genes that control normal cell functions. Mutation may lead to abnormal cell growth. It may involve loss of suppresser genes that usually restrict abnormal cell growth. Many other factors are involved (e.g., growth factors, immune suppression, and hormones).

Safety Pharmacology studies are carried out in animals at the efficacy dose to identify toxic responses of various organ systems. Commonly carried out studies are focused on cardiovascular system, central

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nervous system and respiratory system. Other Safety Pharmacology studies include urinary system, gastrointestinal system and any other systems on a case-by-case basis.

It is the regulatory requirement that all the above mentioned studies are carried out within an internationally acceptable quality system known as Good Laboratory Practice (GLP). GLP is concerned with the organizational process and conditions under which non-clinical toxicity / safety studies are planned, performed, monitored, recorded, reported and archived.

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Health benefits of black tea and its role in the management of preeclamptic pregnancy

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PLENARY LECTURE

Tea, an aromatic beverage has been used as a health drink for more than 10decades. It is the second most consumed comforting and pleasant beverage in the world and it has been postulated as complementary and alternative medicines because of its anti-stress activities. Tea is brimming with antioxidant that scavenges cell-damaging free radicals. Hypertensive disorders in pregnancy, especially preeclampsia, remain a major cause of maternal and infant morbidity and mortality worldwide. Many different strategies to prevent preeclampsia have been investigated, but none have been found to be widely effective. Experience with the synthetic drug for treatment of preeclampsia indicates a significant impact on both maternal and fetal health. However, natural antioxidant supplements for women like tea can increase their resistance to stress during preeclampsia. Antioxidant status and possible positive effect of black tea administration in controlling and preventing the oxidative stress during pregnancy in particular context to preeclampsia has been extensively investigated in our laboratory. The study clearly explains the cytoprotective effect of black tea and underlying molecular mechanisms. Thus the future targets for the therapeutic intervention during preeclampsia have been demonstrated. In conclusion, black tea can be recommended as an effective dietary supplement during pregnancy particularly preeclampsia.

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Exploiting nature for therapeutic interventions to alleviate human diseases

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PLENARY LECTURE

Natural products have provided considerable value to the pharmaceutical industry over the past half century. Many natural products and synthetically modified natural product derivatives have been successfully developed for clinical use to treat human diseases in almost all therapeutic areas. In particular, the therapeutic areas of infectious diseases and oncology have benefited from numerous drug classes derived from natural product sources. Natural products are secondary metabolites of plants and microbes. These secondary metabolites are interpreted to be signaling molecules that assist in maintaining survival and protection against various infectious and chronic diseases. They also serve as biochemical tools that can be used to elucidate the role of specific signaling pathways in diseases. In addition to the natural products which have found direct medicinal application as drug entities, many others can serve as chemical models or templates for the design, synthesis, and semi synthesis of novel substances for treating humankind's diseases. Natural product research has enormous yet unexploited potential, and describes the important advantages and disadvantages of natural product derived molecules as drug candidates for development. Unfortunately, pharmaceutical companies have significantly decreased activities in natural product discovery during the past several years. Despite what appears to be a slow death of natural product discovery research, many new and interesting molecules with biological activity have been published in the past few years. If natural product materials continue to be tested for desirable therapeutic activities, we believe that significant progress in identifying new antibiotics, oncology therapeutics and other useful medicines will be made.

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Herbs as therapeutics

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PLENARY LECTURE

Plants are organisms that utilize solar or chemical energy to synthesize starch and constitute the basic component of any food chain as the producer. All food chains must start with a producer. Herbs are plants generally used in food either raw or in cooked form for its flavor, color and texture. Use of herbs for treating ailments has been practiced since times immemorial. The ancient Ayur Veda and Chinese medicine have used herbs for preventing and curing ailments. The Holy Bible refers to several herbs for their culinary and healing powers.

Plants produce phytochemicals for photosynthesis, growth, and metabolism and for protection against predators. These phytochemicals when consumed by the consumers in the food chain offer long term benefits. Around 12000 such compounds have been isolated and identified. This is estimated to be less than 10% of the actual available number. Most of the primary metabolites are sugars which are produced by all plants. The secondary metabolites are more important. They are specific for the plant species and have specific functions e.g., terpenoids, tannins, flavinoids, alkaloids. They may be toxins, pheromones or pigments.

Traditionally, the herbs are used in whole or in part for therapy or cure. In modern times, the active compound is extracted, scientifically characterized and synthesized commercially e.g., Inulin from root of Dhalias, quinine from Cinchona, morphine from poppy seeds. Use of the whole plant or the whole extract in traditional medicine reduces the harmful effects of the active compound as it is neutralized by other compounds in the extract. Hence traditional medicine is considered more holistic whereas the modern medicine uses the concentrated active compound which may lead to unpleasant side reactions.

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Extracts from herbs have multipronged applications – there are proven microbicidal compounds - antibacterial, antiviral, antifungal, antiparasitical, larvicidal. Some are used for treating systemic ailments such as jaundice, skin infections, gastric ulcers, blood purification etc. Herbs have also found application in the cosmetic industry e.g., skin rejuvenation, hair care.

The latest modern science Pharmacognosy deals with medicines from plants. The functional active compounds from several herbs have been extracted and many of them are already translated in to modern drugs. A thousand more active ingredients are awaiting discovery. Large scale well channelized efforts are needed to bring out the potential of these ingredients into active therapeutic use. It is time Indian Scientists wake up to the wonderful wealth of knowledge and prevents losing them in patent wars.

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Endangered mega fauna of India

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PLENARY LECTURE

India is one of the world's biodiversity-rich countries. The varied climatic zones of the Indian subcontinent have given rise to a wonderful variety of plant and animal forms during the course of evolutionary history. India is home to a big proportion of endemic flora and fauna. India ranks next to Africa in terms of the diversity of mega fauna. Important large mammals endemic to the Indian sub continent include the Asiatic lion, the royal Bengal tiger, one horned Rhinoceros, Asiatic elephant, gaur, water buffalo, wild ass, several species of deer, antelopes and primates. Most of the mega fauna have restricted distribution and face serious threat of extinction due to multiple factors such as habitat fragmentation and shrinkage, and poaching. The conservation efforts to save these denizens of India lack commitment and resources. Involvement of people and the awareness of our natural heritage is vital in order to save our wildlife for the future generations.

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"Nanostructured BIOGLASS"- A Prominent Choice for Orthopaedic and Dental Implants

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PLENARY LECTURE

Nanostructures are at the leading edge of the rapidly developing field of material science in nanotechnology with many potential applications in clinical medicine and research. Due to their unique size-dependent properties nanostructures offer the possibility to develop both new therapeutic and diagnostic tools. In particular, nanoscale materials play a prominent role in both orthopaedic and dental implants. An effective approach to bone tissue engineering aims to restore function to diseased or damaged bone tissue by combining isolated functional cells and biodegradable scaffolds made from engineered biomaterials. Multidisciplinary teams of scientists are working on design and fabricate the suitable scaffolds, on solving cell related issues and investigate the engineering of tissue construct in vitro and invivo. Nanostructured Bioglass (NBG) possesses excellent bioactivity and cell compatibility, and is regarded as a promising next-generation biomaterial in the bone-regeneration field. Bioglass coatings are also more resorbable and have higher bone bonding ability than HAP coatings due to their initial physicochemical reaction with the body fluid. However, the formulation of NBG is limited to bulk, crushed powders and micro-scale fibers. Compared to bulk, Nanoscale Bioglass will enhance the osteo-integration to the Extracellular Matrix because of its high surface area and mimicking the size of the bone fundamental units. 45S5 Bioglass (Composition [in wt%]: 45% SiO_2, 24.5% Na_2O, 24.5% CaO, and 6% P_2O_5), was the first man-made inorganic materials engineered to bond to bone tissue which possesses both the property of osteo-conductivity (ie. Enhances the cell proliferation) and osteo-inductivity (i.e. supports the bone formation). These inorganic materials provide an ideal environment for colonization, proliferation, and differentiation of osteoblasts to form new bone exhibiting mechanically strong attachment to the implant surface.

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Design, Synthesis and characterization of Zinc-Diosmin complex and evaluation of its antidiabetic potential in STZ-induced experimental diabetes in rats

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ABSTRACT

Zinc is an essential trace element succeeding iron in the human system. The presence of zinc in insulin molecule indicates a causal link between zinc and diabetes. Most of the zinc complexes so far investigated for their possible antidiabetic activity were poorly absorbed in their inorganic forms and required high doses which have been associated with undesirable side effects. In order to circumvent the chronic toxicity, various organo zinc complexes have been formulated and studied for their antidiabetic activity. Diosmin is a flavone glycoside found to be present in appreciable quantities in citrus fruits. In the present study, an attempt has been made to synthesize and characterize a novel zinc diosmin complex and evaluate its therapeutic efficacy in streptozotocin induced experimental diabetes in rats. Spectral studies such as IR, NMR and Mass were carried out to characterize the complex. Treatment with zinc-diosmin complex to diabetic rats at a dose of 5mg/kg body weight/day for a period of 30 days significantly decreased the levels of fasting blood glucose, glycosylated hemoglobin, urea, uric acid and creatinine in diabetic treated group of animals. Determination of plasma insulin level revealed the insulin stimulatory effect of the complex. In addition, the elevated levels of the serum transaminases and alkaline phospatases were normalized upon treatment with the complex indicating the nontoxic nature of the complex.

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Hypolipidemic and antiperoxidative potential of an edible mushroom *Volvariella volvacea* in Streptozotocin– Nicotinamide administered rats

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ABSTRACT

Hyperlipidemia is one of the major risk factors for cardiovascular disease in diabetes especially type II. Synthetic lipid lowering agents may cause mild to severe side effects. Mushrooms are the unexploited source of biologically active agents and offer protection against various disorders. They are low calorie food with low fat and zero cholesterol. The present study examined the effect of methanol extract of an edible mushroom *Volvariella volvacea* on lipid profile (TC, TG, LDL, VLDL & HDL) in serum, lipid peroxides and protein carbonyls in heart tissue in STZ induced rats. Rats divided into 6 groups were administered with Streptozotocin (STZ) (60mg/kg) and nicotinamide (110 mg/kg) intraperitoneally to induce hyperglycemia, except group I (control). Group II served as diabetic control. Two groups (III&IV) of rats were administered with methanol extract of mushroom (200 & 400 mg/kg) orally for 30 days. Another STZ treated group (V) was given Glibenclamide (10 mg/kg) and the group VI received Vitamin E (40 mg/kg).The results showed that administration of mushroom extract elicited significant reduction of lipid profile except HDL which showed significant elevation. An appreciable fall in lipid peroxides and protein carbonyls was observed in the heart of *V.volvacea* treated rats. The effect of mushroom was comparable to the Glibenclamide and Vitamin E. This study demonstrated that the mushroom *V. volvacea,* offers promising hypolipidemic and antiperoxidative effects in STZ induced rats.

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Hepatoprotective Activity of Medicinal Plants, *Phyllanthus sp*. in zebra fish (*Danio rerio*)

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ABSTRACT

Liver is an important organ actively involved in many metabolic functions and is the frequent target for a number of toxicants. Hepatic damage is associated with distortion of these metabolic functions. Acute animal exposure tests in rats, mice, rabbits, and guinea pigs have demonstrated carbon tetrachloride to have low toxicity from inhalation exposure, low-to-moderate toxicity from ingestion, and moderate toxicity from dermal exposure. There are numerous plants and traditional formulations available for the treatment of liver diseases. About 600 commercial herbal formulations with claimed hepatoprotective activity are being sold all over the world. Around 170 phytoconstituents isolated from 110 plants belonging to 55 families have been reported to possess hepatoprotective activity. However, only a small proportion of hepatoprotective plants as well as formulations used in traditional medicine are pharmacologically evaluated for their Safety. The zebra fish (*Danio rerio)* is a prominent model vertebrate in a variety of biological fields and biomedical research. It involves various methods to study and evaluate the chemical toxicity, drug development /discovery, and human diseases etc. Hepatoprotective activity of medicinal plant extracts *P. amarus* and *P.emblica* on zebra fish against carbon tetra chloride induced liver damage was assessed. The liver enzymes SGOT and SGPT levels were estimated in order to find the extent of liver damage and the hepatoprotective activity of the medicinal plant extracts used. The protein levels were also studied. The histopathological study was done to evaluate and validate the result obtained from the above studies. The results were found to be significant.

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In silico docking of Phytochemicals from *Ballota nigra* against Human Estrogen Receptor

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ABSTRACT

Breast cancer is the most widespread cancer and foremost causes of death among women worldwide. About 70% of breast cancers are caused by Estrogen Receptor(ER). Estrogen and its receptor were responsible for the cell proliferation in large proportion of breast cancers. Binding of estrogens to the Estrogen Receptor promotes cancer growth in ERα positive breast cancer cells. Phytochemicals are proved to be very successful to reduce the possibility of cancer. The main aim of the study is to find better natural compounds with high binding affinity for breast cancer receptors, which pave the way to breast cancer treatment. Therefore, the main insight in understanding potential inhibitory effects of phytochemicals from *Ballota nigra* has been observed to target the breast cancer. *Ballota nigra* of the family Lamiaceae has been known for many eras as a traditional medicine. Human Estrogen Receptor was retrieved from the protein databank (PDB ID: 2iok) and active sites were analysed. Then the molecular docking studies of the sixteen phytochemicals was taken and docked into active site of Human Estrogen Receptor. Among those compounds, the three best compounds showed good binding energy of -11.3459, -11.0563 and -11.0399 kcal/mol. From this result, it is evident, that the three phytochemicals of the *Ballota nigra* will be the potent Human Estrogen inhibitor for the treatment of breast cancer.

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Bacteriological analysis of ESBL producing gram negative bacilli from clinical samples

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ABSTRACT

Drug Resistant bacteria are emerging worldwide and their presence in a clinical infection can result in treatment failure, if the wrong drugs are used. ESBL are a group of enzymes that mediate resistance to extended spectrum (3rd generation) cephalosporin and monobactam. β-lactamases are produced by several Gram negative organisms, the most important single mechanisms of resistance to penicillins and cephalosporins. Detection of ESBL producing Gram negative bacilli by using various methods. Analysis of ESBL prevalence in a Tertiary care hospital – CHRI. ESBL detection by phenotypic methods. 6672 (1 year) 4272 – urine samples. 1176 – Showed significant bacteriuria. Organisms isolated were *E.coli 735*, *Klebsiella spp* 111 , *Acinetobacter spp 76*,*Pseudomonas spp 80*, *Citrobacter spp* 64, *Proteus spp 69* and *Enterobacter spp 41*. Of the 1176 isolates, 80 were detected to be ESBL producers. Of the 1759 Exudate samples tested, 846 samples showed significant growth of which, *E.coli* 164 *Klebsiella spp* 129 *Acinetobacter spp 106 Pseudomonas spp 245 Citrobacter spp* 108 *Proteus spp 68* and *Enterobacter spp 26.* Of the 846 samples, 43 showed as ESBL. Of the 641 Sputum samples tested, 344 samples showed significant growth of which34 were *E.coli*, *Klebsiella spp* 79, *Acinetobacter spp 84*, *Pseudomonas spp 105*, *Citrobacter spp* 32. With in this 18 strains are showed as ESBL producers. The ESBL detection was carried out following by (NCCLS-2000) National committee for clinical laboratory standards.

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In silico Identification of novel Aldose Reductase Inhibitors for diabetes from *Sterculia foetida*

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ABSTRACT

Diabetes is one the metabolic disorder of chronic illness, which is characterized by the body inability to provide adequate blood sugar control. The role of the aldose reductase in diabetic neuropathy is widely described as it increases the glucose concentration in the tissue, organ, muscle were the insulin activity was insensitive and by damaging the eye and nerve. Currently used drug are made up of Synthetic compound and noticed that it leads to some side effect and also less effective in preventing long term complications. Therefore, some extra attentions were needed to discover plant derived compounds as the best inhibitors without any side effect. On the literature survey of the plant belonging to mallow family, the plant *Sterculia foetida* was found enriched with medicinal properties and its 28 compounds were identified. Molecular docking Analysis was executed in this study to identify novel inhibitor for aldose reductase protein from the plant compounds. Docking result revealed that 2 compound exhibit best protein – ligand binding interaction of < -15 kcal/mol when compared with other compounds and it also satisfies the ADME properties. This study can be taken to the next step of drug designing, *in vitro* and *in vivo* analysis for the safety usage of dose to the patients.

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Design, synthesis and characterization of zinc-morin, a metal flavonol complex and evaluation of its antidiabetic potential in HFD-STZ induced type 2 diabetes in rats

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ABSTRACT

Zinc is an essential trace element crucial for the function of more than 300 enzymes and equally important for cellular processes like cell division and apoptosis. Hence, the concentration of zinc in the human body is tightly regulated and disturbances of zinc homeostasis have been associated with several diseases including diabetes mellitus, a disease characterized by high blood glucose concentrations as a consequence of decreased secretion or action of insulin. The present study deals with the synthesis, characterization of zinc-morin complex and evaluation of its antidiabetic efficacy in High Fat Diet (HFD)-fed low dose Streptozotocin (STZ) induced diabetic rats. Oral administration of zinc-morin complex to diabetic rats (5mg/kg body weight/day) for a period of 30days resulted in the decreased levels of fasting blood glucose and HbA1c. Oral administration of the zinc-morin complex for a period of 30days significantly improved hyperglycemia, glucose intolerance, and insulin resistance. The elevated levels of lipid peroxides such as TBARS declined and the antioxidant competence interms of enzymatic and non-enzymatic were found to be improved in diabetic rats treated with the zinc-morin complex. In conclusion, the present study indicates that the zinc-morin complex possess significant antidiabetic and antioxidant potentials in HFD-fed STZ induced diabetic rats.

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An *in vitro* 5-flouroucil drug delivery studies of Magnetic Bioglass for Hyperthermia treatments

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ABSTRACT

Bioactive ceramics refers to materials, which upon being implanted within the human body interact with the surrounding bone in such a way as to encourage the formation of new bone as well as forming an interfacial bond with the new bone being laid down. Bioactive glasses are a group of surface reactive glasses that release ions into the local environment, which can then trigger a range of biological responses. The most desirable response is for the glass to stimulate the formation of new bone by the release of sodium, calcium, and phosphate ions. In the present work, 45s5 bioglass was chosen, since it has both the property of osteo conductivity (ie. Enhances the cell proliferation) and osteoinductivity (i.e. Supports the bone formation). This material has been coated on magnetite (Fe_3O_4) nanoparticles using modified stober method. XRD, FTIR and TEM characterization were done to analyze the crystal structure and the morphology of the samples. The magnetic properties of the nanoparticle were studied using 5-flourouracil for anticancer.

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Anti-obesity effect of cinnamaldehyde in high fat diet induced obese rats

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ABSTRACT

The current study was undertaken to evaluate the efficacy of Cinnamaldehyde (CA) supplemented diet in management of obesity in high fat diet (HFD) fed rats. 30 adult male rats were assigned to five group of 6 rats each; the standard diet group (N); the HFD group; HFD supplemented with Orlistat (OR); group IV and V animals received CA at a dose level of 40, 80 mg/Kg body weight (CA-I, CA-II) along with HFD for 8 weeks. Obesity induced group of rats showed significant ($p< 0.001$) increase in body weight, feed consumption, Glucose, Leptin, TG, TC, LDL-c, VLDL-c in serum, AI, CRI and decrease in HDL-c level ($p< 0.001$) compared with the normal group of rats. The BWG and FER were reduced in CA treated rats. CA treatment also resulted in significant ($p< 0.001$) decreases in serum Glucose, Leptin, TC, TG, LDL-c, AI and CRI and increase ($p< 0.001$) HDL-c concentrations in a dose dependent manner compared with untreated obese rats. These results were comparable with Orlistat, a standard anti-obesity drug. Significantly increased lipid levels were discharged in faeces during the supplementation of CA and OR. CA treatment with group V animals was more effective in reducing the physiological parameters and biochemical profiles to near normalcy. These preliminary results revealed that CA supplementation was beneficial in suppressing obesity in HFD fed rats. So, CA can be taken up for further studies leading to a novel therapeutic drug for obesity.

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Pharmacophore based inhibitors designing and molecular interaction studies on bioactive leads-An attempt to explore the new inhibitors for human epidermal growth factor receptor

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ABSTARCT

The malignant is considered an important killer and threat to human in various ways. Malignant breast neoplasm or Breast cancer is a type of cancer originating from tissues of breast and it occurs mostly in inner lining of milk ducts which is responsible for supplying the milk. The key factor involved in cell growth, proliferation and cell differentiation is epidermal growth factor (EGF). EGF is generally responsible for malignancy. Several drugs are discovered for breast cancer and most of them are synthetic in origin and a few plant origin. Several drugs were designed for cancer using rational drug design approach but it has several drawbacks and it also time consuming practice. The recent years an alternative approaches are being used for drug designing to explore the efficient drug molecules. Pharmacophore based inhibitor designing is one of the effective and successful technique used in lead discovery. Several bioactive compounds were derived from various plant species namely vinblastin from species *Catharanthus roseus*, paclitaxel from species *Pacific yew*, montamine from species *Centaure centauriam*, gossypol from species *Thunbergia grandiflor*, vincristine from species *Catharanthus roseus*. Based on the plant compounds, pharmacophore model were generated using HipHop program and then selected compounds were used for molecular interaction studies with EGF protein using Discovery studio-LigandFit program. As a result of docking we have identified that montamine showed better interaction with target protein. Thus, *in silico* studies will help us to predict the potential anticancer compounds in future using Pharmacophore modeling and mapping techniques.

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GC-MS analysis on ethanolic and water extract of coastal medicinal plant *Pedalium murex*

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ABSTARCT

The plant samples of *Pedalium murex* was made to work in Soxhlet apparatus for conquering its alcoholic and aqueous extracts. They were subjected to GC-MS examination under column Elite – 1 (100% methyl polysiloxane). Gas chromatography combined with Mass Spectrum (GC-MS) of the purified isolated compounds was recorded by direct inlet method. The constituents were identified by comparing GC-MS data with those given in library and reported in literature. Of the 28 compounds of PM alcoholic extract, Oleic acid constituted the major part and propanoic acid, 1-methylpropyl ester was the least part. In aqueous extracts of PM of 22 compounds, oleic acid is in larger amount and the compounds like 2,5- dimethyl-4-hydroxy-3(2H)-furanone; 2(3H)-Furanone, dihydro-4-hydroxy-; (+)-3,5-di-O-methyl-Z-deoxy-D-ribono-1,4-lactone; 1,6; 3,4-dianhydro-2-deoxy-a-d-lyxo-hexopyranose; Hexadecanal and cyclohexane, 1,1'-(2-tridecyl-1-3-propanediyl) bis are present in trace amounts. The presence of above mentioned bioactive secondary metabolites of *Pedalium murex* reveals the medicinal value of the plant and its significance in the treatment of skin diseases, piles, heart troubles, leprosy, asthma etc.

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Assessment of antioxidants, anti-radical and anti-lipid peroxidation activities of three honey samples

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ABSTARCT

Most of the chronic diseases prevalent today are associated with oxidative stress. Prevention of this oxidative stress could be one of the effective means of managing these diseases. This, therefore necessitates the supplementation of antioxidants so as to delay, prevent or remove oxidative damage. Honey is one of the well-known dietary antioxidant and it also possess many medicinal effects. It has also been proven that the therapeutic potential of honey is always associated with its antioxidant effect against reactive oxygen species. In the present study the antioxidant activities based on free radical scavenging and lipid peroxidation inhibition were investigated in three different varieties of honey and the results were correlated with the total phenolic acids, flavonoids and total antioxidants of the respective samples. From the results obtained it was observed that the highest free radical scavenging activity and minimum IC_{50} value was recorded with Manuka honey, followed by Native, and commercial honey. The lipid peroxidation inhibition was also observed to be maximum in Manuka, followed by native and commercial honey. The antioxidant contents were also found to correlate strongly with the antioxidant activities. From the results it has been speculated that the natural honey possess significant antioxidant properties when compared to the processed commercial honey and in addition it has been observed that the activity of Indian native honey was almost equivalent to the gold standard Manuka honey.

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Biodiesel synthesis from waste cooking oil using hetero poly acid (HPA) Supported mesoporous MCM-48 as a Catalyst

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ABSTRACT

Biodiesel is an alternative biofuel produced by chemically reacting a vegetable oil or animal fat with a short-chain alcohol, such as methanol, ethanol, or butanol and a catalyst. It is an important tool for combating environmental degradation because of its eco friendly nature, liquid nature, and easy portability. However, a global debate has now emerged because this fuel is derived primarily from soybean oil or other cereals where, using food to produce fuel is not reasonable considering the increase in world population. In the present study, we have synthesized Phospotungstic acid (HPA) supported Mesoporous MCM-48 catalyst and the synthesized materials were characterized by XRD, SEM and TEM. Catalytic activity of the above characterized materials was used to test their activity towards transesterification of waste cooking oil and ethanol also investigated. The effect of reaction temperature, catalyst concentration, ethanol: oil molar ratio and reaction time were investigated. The physical properties of the product were analyzed by diesel engine and the maximum product was analyzed by GC-Mass.

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Total phenolic contents and antioxidant properties of some selected seaweeds from seacoast of mandapam, Tamilnadu

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ABSTRACT

Many types of macroalgae contain a wide range of novel and biologically active compounds that have antioxidant potential. It is a great challenge to bring the marine chemical diversity to its therapeutic potential. Moreover, in contrast to terrestrial plants, only a few studies have reported the antioxidant activity of seaweeds. Therefore, in the present study, five marine seaweeds from the coastal area of Tamilnadu were selected and their extracts were prepared with ethanol, ethyl acetate and hexane. The total phenolic contents through Folin–Ciocalteu method, total antioxidants using phosphomolybdenum method and antioxidant activity using the 2, 2-diphenyl-2-picrylhydrazyl hydrate (DPPH) method and lipid peroxidation assay were evaluated. From the result obtained, it was seen that the total phenolic content was found to be comparatively higher in ethanolic extract of *Gracilaria sp*. and *turbinaria conoides* when compared to *Sargassum sp*., *Kappaphycus alvarezii* and *Gracilaria corticata*. The maximum antioxidant activity was exhibited by the ethanol extract of *Turbinaria conoides*, followed by *Gracilaria sp*. and other three seaweeds. The radical scavenging effects were found to be more significant in ethanol extract of *Turbinaria conoides* followed by *Gracilaria sp*. at varying concentrations. The present study suggests that seaweeds may be considered as one of the potent antioxidant that can fight against oxidative stress.

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In Silico docking analysis to identify potent inhibitors from the extract of *Eucalyptus tereticornis* against malarial proteins

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ABSTRACT

Malaria is a lethal disease caused by protozoan parasite of Genus *Plasmodium* which affects 9.27 million people and takes a toll of 40,297 every year in India. As these parasites are having the capability of developing resistance to currently used drugs, it is essential to identify new antimalarial natural drug having no side effects. *Eucalyptus tereticornis* is famous for its antiseptic property but, the recent literature studies revealed that it also posses anti malarial properties. In the current investigation, a study was conducted to search and predict effective anti-malarial lead compounds from *E. tereticornis*. From the study, disease causing proteins present in the parasites were recognized as potential target and five new plant compounds possessing antimalarial activity were identified as inhibitors. *In Silico* molecular docking were performed between target proteins and there inhibitors. The 3D structures of the targets and inhibitors were retrieved from PDB and Pubchem for further analysis. The Ten target proteins – Five ligands' interaction studies were performed and its ADME properties were also checked. The docking result revealed a particular target showing best binding affinity with all the inhibitors when compared with other targets. Further, this study can be implemented to *in vitro* and *in vivo* analysis thereby helping in development of novel drug against malaria.

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Neem (*Azadirachta indica*) extract as an immunostimulant in fresh water fish, *Catla catla*

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ABSTRACT

Azadirachta indica is widely prevalent and highly esteemed wonder tree of the Indian subcontinent and several of its beneficial properties are reported .The Neem tree has been in use for ages and Ayurveda regards this as 'Sarvaroga nivarini' which means "cure for all diseases". Biomedical research has shown that *A. indica* possesses anti HIV, anti-tumor and anti-microbial activities. In an attempt to find the possible immunostimulatory effect of medicinal plant, the present study was carried out to determine the effect of azadirachtin, a triterpenoid derived from neem seed kernel on the immune response in the fresh water fish, *Catla catla*. *Aeromoans hydrophila*, fish pathogenic bacteria was used as an antigen to evoke immune response. A range of sub lethal dose of 0.1, 0.01 and 0.001 % LD_{50} of azadirachtin were administered to the experimental fishes. After a week control and experimental fishes were immunized with A. hydrophila through intraperitoneal route. An untreated immunization control group was also maintained. A booster injection was given on 16^{th} day post immunization with the same does of antigen. The immune response in fish was measured by quantifying antibodies produced in the fishes by using haemagglutination assay. Azadirachtin at the level of 0.001 % significantly enhanced the maximum primay (3.67$\pm$0.58) and secondary (6.33$\pm$0.58) antibody response and an inverse relationship was observed between the dose of leaf extract and the degree of immunostimulation. The observed immunostimulatory property of azadirachtin has an implication in the maintenance of fish health in fresh water intensive aquaculture practices.

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The Superior Antibacterial Activity of Ag-Nanorod/Graphene Oxide Composite

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ABSTRACT

In the present study, a simple and effective method for the synthesis of silver nano-rod was developed. Graphene oxide (GO) was synthesised by the simple oxidation of graphite powder. The GO synthesised was characterised by UV-Visible spectroscopy, FT-IR, XRD and SEM. The Ag-nanorod and Ag-nanorod /graphene oxide composite were characterized by UV-Visible spectroscopy and SEM. The antibacterial activities of GO, Ag nanorod and Ag-nanorod /graphene oxide composite were tested using a gram negative and gram positive bacteria. The GO-Ag composite showed good antimicrobial activity against the gram - negative and gram – positive bacteria tested. The study suggested that the nano composites can be used as an effective antibacterial material.

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Evaluation of Biochemical composition, Secondary metabolites, Antioxidant activity and Heavy metal ions in the Ethanolic leaf extract of *Croton bonplandianum*

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ABSTRACT

Plants have been in use ever since the ancient time to the present day context as their modernization study focuses on separation, identification and structural elucidation of active compounds. In this study, the ethanolic leaf extract of *Croton bonplandianum* was evaluated for biochemical macromolecules and secondary metabolites. The extract was found to contain increased protein, carbohydrate and lipid content [350mg/g, 8mg/g, 1mg/g respectively] contributing to the bioactivity of the natural entity. Presence of these moieties can increase drug water solubility, decrease toxicity, and/or contribute to maintenance of physiological homeostasis. Secondary metabolites such as phenols (41.26±0.39µg/ml), flavonoids (7.53±0.31 µg/ml) and tannins (46.75±0.14 µg/ml) have been identified as free radical scavengers and show important anti-inflammatory, anti-allergic and anti-cancer activities. In addition, the reducing power of the extract showed to increase with increasing concentration, exhibiting potential antioxidant activity of the plant. The levels of selected metals (Mg, Fe, Mn, Zn, Cu, Cr, Ni, V, Ag, Cd, Pb) were assessed using ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometry) which were found to be in safe limiting quantities. Specially, metals such as Mg, Zn, Cr (235.500 PPB, 0.584 PPB, and 0.100 PPB respectively) are vital so much that their deficiencies have shown to predispose a person to glucose intolerance and to promote the development of diabetic complications. Based on these preliminary analyses, it could be suggested that *Croton bonplandianum* leaf extract can act as a good source of secondary metabolites and essential metals.

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Synthesis of chitosan from mushroom extract and its application in antibacterial activity

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ABSTRACT

Chitin (poly-N-acetylglucosamine) is ubiquitous biopolymers which occur naturally as a major component in the skeletal and exoskeletal structures of lower animals. Chitin is also present in the vast majority of fungi as the principal fibrillar polymer of cell wall. The deacetylated form of chitin, chitosan has unique properties which make it useful for variety of Industrial application such as viscosity control agent, adhesive, paper strengthening agent and flocculating agent. Besides their traditional usage as a source of many pharmacologically active compounds, mushrooms can be used for cheap production of medical-grade chitosan, promising biocompatible and biodegradable candidate for many medical applications. Moreover, chitosan has wound healing and haemostatic properties and can be used for controlled release of biologically active compound. In this study, we have isolated chitosan from local mushroom. Isolated Chitosan was tested for antimicrobial activity by measurement of Zone of inhibition with varying parameters such as pH and temperature.

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Homology Modeling and Docking Studies on stem cell derived protein BDNF of Alzheimer's disease

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ABSTRACT

Alzheimer's disease (AD) is the most important neurodegenerative disorder that affects brain neurons by forming plaques and tangles. Till today neither vaccine nor effective drugs were identified to cure the disease and in the last few years, research is going on stem cell to find out better treatment for treating AD patients. From the research on "neural stem cell" it was recognized that the protein "neurotrophin" enhances the level of neurotrophin in brain which will be fruitful in treating AD. The protein neutrophins possess four factors (NGF, BDNF, NT3, NT4), among them BDNF (brain derived neurotrophic factor) plays an important role in enhancing the process of "neurogenesis". The objective of the present work is to evaluate the effect of protein (BDNF) and drug (ligand) interaction. The protein BDNF was modeled for docking studies. From the literature survey, the eight drugs which induce BDNF were identified and its structure was retrieved. Docking results were analyzed and the drugs were ranked according to its binding interaction with protein. Among the 8 drugs, FTY720-P exhibits the highest binding energy -9.72442kcal\mol by having best hydrogen bond interactions with active site residues of the protein. In future this study can be further implemented to *in* vitro analysis for the drug designing which play a central role in lowering the effect of AD.

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In silico identification, analysis and Docking of SNP in human FGF20 Gene for Parkinson Disease

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ABSTRACT

Parkinson Disease is the second most spreading neurodegenerative disease which occurs due to the depletion of dopamine level in the brain. Recent studies on this disease revealed that it can also be occurred by some genetic factor. In the current study of genetic Parkinson disease it was identified that, there was some mutation occurred in the gene encoded protein FGF20 which is responsible for the depletion of dopamine level. An attempt was made, to correct the presence of mutation in the gene using SNP analysis and Prediction tools to make the gene function normally. SNP tools predicted that D206N SNP present in protein sequence is not only affecting the protein structure, but also alter gene function when compared with other SNP's present in the gene. The SNP 3Dstructure structure of FGF20 was retrieved. Using mutation tool the SNP was altered on the 206th position of the protein sequence (Aspartic Acid was replaced for Asparagine). Then energy minimization was carried out. Further Molecular docking were done for this normalized protein against currently used 5 drugs for Parkinson disease which will usually increase the Dopamine level. Finally the drug shows highest binding affinity of -259.90 kcal/mol with normal FGF20 protein was reported. This study can be further executed for *in vitro* clinical trials.

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Synthesis of silver nanoparticles by greener way and their applications toward antibacterial activity against *E.coli*

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ABSTRACT

The unique property of the silver nanoparticles having the antimicrobial activity drags the major attention towards the present nanotechnology. The environmentally nontoxic, ecofriendly and cost-effective method that has been developed for the synthesis of silver nanoparticles using plant extracts creates the major research interest in the field of nanobiotechnology. In this work, we have used onion (*Allium cepa*) extract as a reducing and capping agent to minimize the serious environmental pollution problems. The onion extract was mixed with silver nitrate solution and the change in the colour indicates the reduction of silver ions to silver nanoparticles. The size of the nanoparticles was confirmed by various characterization techniques such as UV-Visible spectroscopy, X-ray diffraction (XRD) and Transmission Electron Microscope (TEM). The formed nanoparticles with diameter range between 5-7 nm. The obtained nanoparticles were tested for the antibacterial activity against *E.coli*.

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Free radical –scavenging activity of leaves extract of *Euphorbia hirta* Linn

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ABSTRACT

Euphorbia hirta Linn, a small herb, belongs to family euphorbiaceae, distributed throughout hotter part of India, often found along roadsides. *Euphorbia hirta* is an important plant of Indian ayurvedic system of medicine which is used in the treatment of respiratory diseases, gastrointestinal disorders, wound healing, pulmonary disorders, urinogenital disorders, tumors, lactation in women etc. The plant also has anti-inflammatory, anti-tumour, anti-diabetic, anti-allergic, analgesic, anti-anaphylactic, anti-oxytic, sedative, anti-diarrhoeal, and burn wound healing property. The aim of the study is to found out the phytochemical composition, quantitative analysis of three different extracts (aqueous, ethanol and methanol) of *Euphorbia hirta* from Vellore district and to search for antioxidant activity. Sample of leaves extract from *Euphorbia hirta* were tested for phytochemical screening, total phenol content, flavonoid content. The phytochemical analysis was conducted using standard procedures. Total phenolic contents of the extracts were determined using the Folin-Coicalteu reagent method whereas total flavonoids contents were determined by the aluminium Chloride method. Antioxidant activity of different extracts was determined using the DPPH radical scavenging activity and hydroxyl radical scavenging assay. The chemical constituents of the three extracts of the plant were relatively similar in the presence of tannins, alkaloids, steroids, saponins, flavonoids and glycosides. The ethanol extract showed a high total phenolic and flavonoid contents, followed by methanol and aqueous extract. The ethanol extract of the leaves of *E.hirta* showed potent in vitro antioxidant activities. These results demonstrated that ethanol extracts of *Euphorbia hirta* leaves have excellent antioxidant activities and thus serves as a source for natural health products.

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Antibacterial activity of different phytochemical extracts from the stem bark of *Ficus benghalensis*

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ABSTRACT

The plant extracts and phytochemicals having antimicrobial properties can be of great use in therapeutics. These phytoconstitueunts contribute antimicrobial properties to plants and thus used as natural protective substances against bacterial, fungal and even pesticidal attacks on the plants. Antibacterial activity of various phytoconstituents from the bark of *Ficus benghalensis* (The banyan tree) was studied to rationalize its traditional use. The bark was extracted to various phytoconstituents in order to carryout antibacterial assay which include Tannins, Flavonoids and Saponins. Four concentrations 25µg/ml, 50 µg/ml 75µg/ml and 100 µg/ml of each phytoconstituent of bark extract were applied against five bacterial strains i.e., *Staphylococcus aureus, Bacillus subtilis, Pseudomonas aeruginosa, Proteus vulgaris* and *E.coli* by using disc diffusion method. The inhibition zones were measured in millimeter. The data showed that the inhibition zones the flavonid extract of bark of *Ficus benghalensis* were greater than each of other phytoconstituents, and 100 µg/ml concentration was the more effective than other concentrations. Flavonoid extract was found to be more active than saponin and tannin extracts. Moreover, flavonoid extract of *Ficus benghalensis* recorded more or less equal inhibitory activity against all the five bacteria *Escherichia coli, Proteus vulgaris, Pseudomonas aeruginosa, Bacillus subtilis, Staphylococcus aureus.* The flavonoid extract showed maximum activity against *Bacillus subtilis*, a gram positive bacteria and *Pseudomonas aeruginosa*, a gram negative bacterium. *Ficus benghalensis* can be used to source antibacterial substances for development of novel drugs for the treatment of various ailments.

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Optimization of incubation time for the effective Biodecolourization of Acid orange-VII by immobilized laccase enzyme under laboratory condition

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ABSTRACT

The undesirable limitations of free enzyme catalysts may be overcome by the use of immobilized enzymes. Immobilization is achieved by fixing enzymes to or within solid supports, as a result of which heterogeneous immobilized enzyme systems are obtained. The laccase enzyme was immobilized in sodium alginate gel and was used for the decolourization of acid orange-7. The decolourization was studied by taking the absorbance at the initial and final stages. The percentage of degradation was calculated. The effect of various incubation times (in Minutes) shows that the maximum decolourization by the immobilized laccase enzyme is 60 min. The study on the stability of immobilized laccase enzyme indicates that the immobilized laccase enzyme could be used for 23 cycles of acid orange-7 decolourization.

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Antidiabetic activity of *Artocarpus heterophyllus* rag extract studied in high fat diet - low dose STZ induced experimental type 2 diabetic rats

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ABSTRACT

Jack fruit, the largest tree born fruit in the world, belongs to the family *Moraceae* and genus *Artocarpus*. Various parts of the plant have been reported to possess antibacterial, anti-inflammatory, antioxidant and immunomodulatory properties. The whitish yellow filament like structures present in the fruit is called "rags" which are actually unfertilized flowers that could not develop in to seeds. The rags are widely used in the Indian traditional medicine for the treatment of various ailments. In the absence of systemic reports in the literature, the present study was aimed to evaluate the antidiabetic potential of the *Artocarpus heterophyllus* rags in high fat diet fed-low dose STZ induced experimental type 2 diabetes in rats. Phytochemical screening of the rag extract was performed. Diabetic rats were treated with *Artocarpus heterophyllus* rag extract at a dosage of 300 mg/kg b.w daily for 30 days. Metformin (200 mg/kg. b.w) was used as a reference drug. The levels of fasting blood glucose, plasma insulin and HbA1c were also estimated. The activities of serum aspartate transaminase, alanine transaminase and alkaline phosphatase were also estimated. The rag extract supplementation attenuated the elevated levels of glucose, glycosylated hemoglobin, AST, ALT and ALP. The results show that the rags of *Artocarpus heterophyllus* is non toxic and possess significant antidiabetic properties which might be attributed to the presence of biologically active ingredients present in the rags. Oral treatment results in the improvement of hepatic and muscle glycogen content of insulin resistant diabetic rats.

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Studies on production of Single Cell Protein from A*spergillus niger* using various natural sources

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ABSTRACT

Malnutrition is the major problem facing now-a-days in many developing countries. Deficiency of protein in human food is the main issue. This demand led to the search of non conventional protein sources to supplement the conventional sources. The present investigation was carried out to utilize various cellulosic waste materials as substrate for the production of SCP by using standard from fungi *Aspergillus niger*, which is being isolated from the rice bran, wheat bran and banana peel as the basal media. A synthetic medium namely potato dextrose medium was prepared as reference medium. The collected substrates were used for biochemical characterization namely protein estimation, carbohydrate estimation, calculation of percentage moisture content and the substrates were finally used for the medium preparation for the SCP production. The degree of mycelial biomass growth depends on the type of substrate used. Thus, in the present study different cellulosic substrates considered as waste materials were explored for biomass production (SCP) instead of dumping them. To conclude, rice bran proved to be the best substrate for single cell protein production using *aspergillus niger.* Future prospects will require a need to work on toxicological potential of the single cell thus produced.

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Secondary metabolite content and *in-vitro* antioxidant activities of various fractions of *Croton bonplandianum*

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ABSTRACT

The present study was aimed to determine the secondary metabolites and antioxidant activities in the different fractions of *Croton bonplandianum*. The crude methanolic leaf extract of *C.bonplandianum* was subjected to fractionation using different polarity based solvents like hexane, ethyl acetate and chloroform. The fractions were screened for secondary metabolites and *in-vitro* antioxidant activities. The secondary metabolite contents like flavonoid (95.68 ±0.05 µg/ml), Polyphenol (114.28 ± 0.06 µg/ml) and tannin (63.8± 0.03µg/ml) were found to be high in the chloroform fraction and it showed potent anti-oxidant activities too. *In-vitro* antioxidant activities of the fraction were determined using DPPH, hydroxyl radical scavenging and reducing power activity assays. The Ic_{50} value for the antioxidant activity was found to be high in the chloroform fraction compared to other fractions. Ascorbic acid was taken as control.

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Evaluation of invitro antidiabetic activity of Madhumeha suranam as therapeutic agent for the management of diabetes in NIDDM regimen

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ABSTRACT

Diabetes mellitus is a group of metabolic disorder characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Chronic hyperglycemia is associated with long-term damage, dysfunction, and failure of different organs, especially eyes, kidneys, nerves, heart, and blood vessels. According to WHO, it is estimated that 3% of the world's population have diabetes and the prevalence is expected to double by the year 2025 to 6.3%. Therefore, therapeutic approach for treating diabetes is to control the postprandial hyperglycemia by retarding the absorption of glucose. Oral hypoglycemic agents have effect on glucose metabolism, restore ovarian function in polycystic ovary syndrome, reduce fatty liver and also lower microvascular and macrovascular complications associated with Type 2 Diabetes. Its use was also recently suggested as an adjuvant treatment for cancer or gestational diabetes, and for the prevention in pre-diabetic populations. Though different types of oral hypoglycemic agents are available along with insulin for the treatment of diabetes, there is an increased demand by patients to use natural products [Madhumeha suranam] along with oral hypoglycemic agents in order to activate the functions of different types of glands producing hormone. These herbal drugs can be used for the purpose of rejuvenation in the treatment of diabetes.

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Antioxidant and antihepatotoxic activity of ethanol extract of *Solanum indicum* Linn berries

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ABSTRACT

In the present investigation, the antioxidant and antihepatotoxic activities of the crude ethanolic extract of *Solanum indicum Linn* berries were studied. The total antioxidant activity of herbal ethanolic extract was investigated in linoleic acid emulsion system. Total phenolic and flavonoid content of the extract also determined by a colorimetric method. The ethanolic extract of *S. indicum Linn* berries also showed potent antihepatoxic activity against carbon tetrachloride –induced acute toxicity in rat liver. The extract at a dose level of 200 mg/kg body weight were administered to rats orally once daily for 14 days. The degree of liver protection was determined by estimating the levels of serum marker enzymes such as ALT, AST, ALP, ACP and LDH. The biochemical parameters like total protein, total bilirubin, total cholesterol, triglycerides and urea were also estimated. Silymarin at a dose level of 50 mg/kg was used as standard. The results revealed that *S. indicum Linn* berries extract has notable inhibitory activity on peroxides formation in linoleic acid emulsion system in a dose-dependent manner. There was marked elevation of serum marker enzyme levels in CCl4 treated rats, which were restored towards normalization in these drug treated animals. The biochemical parameters were also restored towards normal levels. The results of this study strongly indicate that the hepatoprotective effect of the plant extract is possibly related to its marked antioxidant activity.

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Assessment of Antimicrobial Efficacy of Essential oil of *Cymbopogon flexuosus* Staph.

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ABSTRACT

Plants produce a high diversity of secondary metabolites with a prominent function of protecting plants against predators and microbial pathogens due to their biocidal properties against microbes or repellence to herbivores. Essential oils, also known as volatile oils, are complex mixtures of volatile constituents' biosynthesized by plants. Essential oils have been used medicinally in history. Essential oils have been traditionally used for treatment of infections and diseases all over the world for centuries. There has been an increasing interest in essential oils during recent years because of the need of new therapies against microbes. *Cymbopogon flexuosus* Staph,commonly called as East Indian Lemongrass, is a perennial grass native to India, Sri Lanka, Burma, and Thailand. Lemongrass essential oil is extracted through the process of steam distillation of dried lemongrass. The main constituents of its essential oil are Myrcene, Citronellal, Geranyl Acetate, Nerol, Geraniol, Neral, Limonene and Citral. Lemongrass has antimicrobial properties which makes it an inhibitor of microbial and bacterial growth in the body, both internally and externally. It is also known to be effective in inhibiting bacterial infections in the colon, stomach, urinary tracts, wounds, respiratory system, and other organ systems, while also helping to cure diseases resulting from bacterial or microbial infections such as typhoid, food poisoning, skin diseases, body odor, and malaria (caused due to protozoon).In the present study the volatile oil of *Cymbopogon flexuosus* Staph. was analysed for its antimicrobial properties viz., antibacterial, antifungal and anticandidal activity. Preliminary screening was done using agar disc diffusion method and the minimum inhibitory concentration of the oil was tested using microbroth dilution assay. From this study, it is concluded that the Indian Essential oil Lemongrass, which is native to Tamil Nadu possess antimicrobial activity. Combinations of essential oils have demonstrated promising beneficial effects and represent another alternative to antibiotic treatment that merits further investigation.

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In silico docking of kappa carrageenan compound against the D7 salaivary protein of adult female *Anopheles stephensi*

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ABSTRACT

D7 subfamily of salivary proteins is widespread in blood sucking *dipteran* insects belonging to the super family of pheromone/odorant binding proteins. Although D7 proteins are among the most abundant salivary proteins in adult female mosquitoes and sand flies, their role in blood feeding remain elusive. Carrageenans or carrageenins are a family of linear sulphated polysaccharides that are extracted from red edible seaweeds. The isolated compound carrageenan was docked with D7 salivary protein of *A. stephensi.* The binding affinities of the ligand with the target protein was carried using molecular docking tools to identify and design a potential mosquito repellent compound to prevent mosquito-borne disease and to suppress human seeking behavior of mosquitoes.

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Propylactic effect of genistein - an alternative to estrogen during preeclampsia

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ABSTRACT

Estrogen is the chief hormone that increases during pregnancy and enables the uterus and placenta to improve vascularization, transfer nutrients, and support the developing foetus during pregnancy. The isoflavone genistein (4', 5, 7-trihydroxyisoflavone) is one of the most abundant polyphenolic compounds naturally present in legumes such as soybeans, soy product and cereals. It possesses antioxidant defense, antihypertensive and antiapoptotic properties which protects the cell from free radical induced oxidative stress (FRIOS) caused by the low level of estrogen. However the effect of genistein on placental cells is seldom explored. The placenta is a major organ, in which trophoblast plays a crucial role during pregnancy. Incomplete trophoblast invasion may lead to pregnancy related disorder like preeclampsia. Since preeclampsia is a hypertensive disorder, administration of synthetic drugs is known to cause deleterious effects to both mother and fetus during pregnancy. Hence phytochemical therapy is recommended. Thus the present study was aimed to evaluate the effect of genistein supplementation on the oxidative stress and antioxidant capacity on trophoblast from normotensive and preeclamptic placenta. A significant increase in stress along with decrease in antioxidant status was observed in preeclamptic placental trophoblast whereas genistein incubation significantly decreased the level of LPO and PC with simultaneous increase in the level of GRR and TAC. Thus the study revealed that genistein may play a significant role in controlling oxidative stress during preeclampsia. Hence, genistein can be used as an effective dietary supplement for the treatment and management of preeclampsia.

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Marine algae - a source of alternate angiogenic therapeutics for cardiovascular disease

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ABSTRACT

The dysfunction in heart or blockage in blood vessels resulted in Cardio vascular disease (CVD) which is one of the major diseases affecting majority of the people around the world. Hence there is a pressing need to find the therapeutics to either prevent or control CVD. The principle cause of CVD is atherosclerosis and hypertension. Atherosclerosis resulted in decreased blood flow in arteries and causing ischemic wounds and hypoxia. The factors including reactive oxygen species (ROS), matrix metalloproteases, growth factors and angiogenesis are modulating the hypoxia induced CVD. To minimize the side effects induced by CVD drugs, functional food from natural sources should be identified. Seaweeds are rich in secondary metabolites and dietary fibers are explored to prevent CVD. For the current study, brown algae *Padina tetrastomatica* is utilized to analyze the efficacy of phytonutrients in angiogenesis. The phytochemical compounds from *Padina tetrastomatica* are analyzed and their antioxidant potential was assessed. The CAM assay was utilized to assess the angiogenic efficiency. The phytonutrients reduced ROS production and induced angiogenesis. In conclusion, *Padina tetrastomatica* can be used as a functional food to control CVD induced by hypoxia and atherosclerosis

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Phytochemical analysis of *Andrographis paniculata* and *Euphorbia hirta* crude extracts

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ABSTRACT

Increase of antibacterial resistance is a global growing problem. Isolation of microbial agents less susceptible to regular antibiotics and recovery of increasing resistant isolates during antibacterial therapy is rising throughout the world which highlights the need for new principles. Plants produce a diverse range of bioactive molecules making them a rich resource of different types of medicines. Higher plants as sources of medicinal compounds have continued to play a dominant role in the maintenance of human health care since ancient times. Over 50% of all modern clinical drugs are of natural product origin and natural products play a vital role in modern drug development in the pharmaceutical industry. In siddha system of medicine the herb Nilavembu (Andrographis paniculata "king of bitters") and Amman paccarici (Euphorbia hirta "cats hair") were used to treat various ailments including infectious diseases. The phytochemical screening of Andrographis paniculata and Euphorbia hirta methanol crude extract revealed the presence of phytochemicals such as starch, alkaloids, flavonoids, tannins, reducing sugars, amino acids and lignin's. The phytochemical analysis and biochemical assays are very important aspects in pharmacognostic evaluation of medical plants. Through the chemical tests in the methanolic extracts of leaves of the two investigated plants, it is found that the important phytochemical groups are present and confirms their medicinal properties.

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Plant mediated green synthesis of silver nanoparticles using aqueous leaf extracts of *Millingtonia hortensis* (L.) against MCF-7 cell line

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ABSTRACT

In the present study, eco-friendly, non-toxic silver nanoparticles were biologically synthesised using leaf extracts of *Millingtonia hortensis* Linn. Formation of AgNPs was confirmed by surface plasmon spectra using UV-Vis spectrophotometer. Spectral techniques such as SEM, XRD, EDAX and FTIR were used to characterize the synthesized AgNPs. Anticancer activity of synthesized AgNPs was tested against human breast cancer cell lines. The results showed that the synthesized AgNPs act as an effective anticancer agent and hence has a great potential in the preparation of drug against cancer.

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Effect of black tea in modulating the asymmetric dimethyl arginine in placental trophoblast during preeclampsia

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ABSTRACT

Trophoblasts are specialized cells of the placenta during pregnancy that plays an important role in embryo implantation and interaction with decasualized maternal uterus. Preeclampsia is a serious disorder of pregnancy, characterized by deficient trophoblast invasion and generalized activation of maternal endothelial cells. Placental hypoxia is responsible for clinical manifestations of this disease. Nitric oxide is an essential for vasodilation of spiral artery synthesized from L-arginine by endothelial nitric oxide synthase (eNOS). These enzymes are competitively inhibited by the Asymmetric dimethylarginine (ADMA) which are by-products of protein degradation, ADMA are predominantly broken down by the enzyme DDAH into L-citrulline and dimethylamine. ADMA are highly expressed in the stress conditions, which affect the placental endothelium during pregnant condition and it may promote the premature delivery. Tea is an alternative natural medicine used for the management and treatment of preeclampsia and its associated complications. The aim of the study is to determine the modulatory effect of Tea (*Camellia sinensis*) on nitrative stress (ADMA) in placental trophoblast (Pt) of normotensive and preeclamptic condition. Results indicate that nitrative stress marker ADMA was significantly increased by 1.3 fold during preeclampsia when compared with normotensive Pt. However incubation with black tea significantly decreased the ADMA level by 13% and 29% in normotensive Pt and preeclamptic Pt respectively. In conclusion the ADMA levels are significantly altered and tea infusions may play a significant role in the management of preeclampsia via ADMA regulations.

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Production, Partial Purification and Characterization of a Thermo Stable Protease from *Bacillus megaterium* – Tk1 & application of Protease in blood cloth destaining

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ABSTRACT

Screening and isolation of protease producing 3 strains of bacteria were carried out from soil samples collected from salt pond kelambakkam, Chennai. The isolates were positive on skim milk agar and thus are selected as protease producing strain. The organisms were tested for various biochemical tests, which lead to their identification as Bacillus megaterium, producing protease enzyme. These Bacillus megaterium could grow upto 48 degree C and pH range 8 .It was also optimized for carbon test and nitrogen test with optimal growth in sucrose and gelatin respectively. Enzyme production was carried in 1 litre of optimized media in the fermenter at 37 degree C for 48 hours at pH 8.0. Harvested protease product was then partially purified by dialysis, ammonium sulphate fractionation method. The protein was characterized using SDS-PAGE. This result showed that Bacillus megaterium TK1 thermostable protease. The enzyme had a capability to effectively hydrolysis protein, casein. This enzyme can be beneficial for industries, such as blood cloth destaining.

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Green Synthesis and Characterization of Gold Nanoparticles using Aqueous Whole Plant Extract of *Alternanthera tenella Colla* and its Biological Activities

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ABSTRACT

Green synthesis of gold nanoparticles (AuNP) is a growing research area because of their wide applications in medicine. The present investigation deals with the biosynthesis and characterization of gold nanoparticles using aqueous extract of whole plant *Alternanthera tenella Colla* and its antioxidant and antibacterial activities**.** Qualitative phytochemical analysis of the plant extract showed the presence of phenols, flavonoids, steroids and saponins. Aqueous extract (pH 7 – inherent pH of the extract) was reacted with 1mM Chloro Auric acid ($HAuCl_4.3H_2O$) and kept at room temperature. The immediate change in color from pale yellow to ruby red indicated the reduction of Au^{3+} ions to Au^0. Gold nanoparticles (AuNP) were characterized using UV- Visible spectroscopy, TGA, SEM, XRD and FT-IR. The UV-Visible spectrum revealed the Surface Plasmon Resonance for AuNP of 5% extract and 1mM Chloro Auricacid at 500-560 nm. FTIR spectra revealed the presence of reducing groups in the extract responsible for AuNP synthesis. SEM showed the presence of polydispersed spherical AuNP. The XRD peaks at 38.42, 44.63, 64.52, 77.58 and 81.81 corresponding to [111], [200], [220], [311] and [222] showed that the AuNP were nanocrystalline in nature with fcc crystal structure. The synthesized AuNP exhibited hydroxyl free radical scavenging and reducing power activity.The gold nanoparticles isolated from *A.tenella colla* showed potent antibacterial activity against *Escherichia coli* and *Staphylococcus aureus* compared to the plant extract.

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Cytoprotective role of black tea in modulating the stress associated proteins in preeclamptic placental explants

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ABSTRACT

Oxygen plays a central role in human placental pathogenesis including preeclampsia, a leading cause of materno-fetal morbidity and mortality. Insufficient uteroplacental oxygenation in preeclampsia is believed to be responsible for molecular events leading to clinical manifestations of this disease. Hypoxia-inducible factor 1-α (HIF-1α) is a key transcription factor that plays a vital role in mediating cellular and systemic responses during hypoxia. It acts as a master transcriptional regulator and activates the transcription of stress protein genes whose protein products facilitate metabolic adaptation to hypoxia. This may trigger different intracellular signaling molecules like heat shock proteins for successful progression of pregnancy and live fetal delivery during preeclamptic stress. Modulations in its regulatory mechanisms affect the maintenance of uterine quiescence during pregnancy and activation of contractile proteins leading to preterm labor. Black tea plays a vital role in reducing oxidative damage in preeclamptic placenta. The present study is first attempt to analyze the modulatory effect of black tea on signaling molecules expression like HIF1-α, HSP70 and HO-1 in placental explant during preeclampsia. 20 cultured placental explants from normotensive and preeclamptic patients were used for this study. Differential expression of HIF-1α, HSP70 and HO-1 were analyzed by enzyme-linked immunosorbent assay (ELISA). The study observed that black tea incubations significantly decreased HIF-1α, HSP70 and significantly increased HO-1 expressions in preeclamptic placental explants. The study highlights the potential therapeutic value of black tea during preeclamptic stress.

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Caffeine degradation by *Brevibacterium Sp*.

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ABSTRACT

Caffeine (1, 3, 7-trimethylxanthine) is a commercially important purine alkaloid synthesized by plants. Environmentally, caffeine has been suggested as a chemical indicator of ecosystem since it is difficultly metabolized. When the exposure dosage of caffeine in water was higher than 300mg L^{-1}, no zebra fish embryos could survive, and caffeine treated embryos exhibited significantly reduced tactile sensitivity frequencies of touch-induced moment even when exposure dosages were very low. It leads to ecological pollutions and becomes a big disposal problem. The average Caffeine intake is found to increase annually in India by the uptake of coffee, cola and other beverages which serves as the main source of caffeine. It stimulates the Central nervous system, increases the contraction power of the heart, widens the vessels of heart, kidney and the skin and exhibits broncholytical and diuretical actions when taking it in limited amount. If overdose, it leads to restlessness, nausea, headache, tense muscles, sleep disturbances, and irregular heartbeats. So, the process of decaffeination is necessary to reduce the caffeine content in coffee pulp and husk. Conventional decaffeination techniques like solvent extraction or use of supercritical carbon dioxide can be expensive, toxic to the environment and non-specific. So there is a strong need for caffeine degradation by alternative routes other than conventional techniques. The potential use of microbes and their enzymes is an attractive alternative as it is cheap, easier and faster. The present study deals with the biodegradation of Caffeine by the selected isolate *Brevibacterium*. The growth and caffeine degradation were recorded as the increase in biomass by weight via Spectrophometer and residual caffeine analysis by HPLC. The growth of *Brevibacterium* was recorded for every 12 hours and was found to increase as 2.653, 4.678, 4.532, 4.859 and 3.892. The degradation of caffeine for every 12 hours was analyzed and found to decrease from initial concentration to 82.6, 64.42, 45.84, 11.06 and 5.92 at 24,36,48,60 and 72 hours respectively.

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Antioxidant, Antimicrobial and Antidiabetic activity of Ethanol extract of *Calotropis gigantea*

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ABSTRACT

Medicinal plants are important source of potentially useful for the development of novel chemotherapeutic agents. *Calotropis gigantea* is a common wasteland weed and known for various medicinal properties. This study investigates the qualitative and quantitative analysis of *Calotropis gigantea* in different extract of leaves, flowers and stems. The extract shows the presence many biologically active molecules. The amount of total phenols were analysed by using Folin-Ciocalteau assay, the amount of total flavonoids were analysed using aluminium chloride colorimetric assay and the amount of total tannins were analysed by using spectrophotometric methods. Ethanolic extract of flower showed highest amount of TPC. Antimicrobial effect of different extract from *C.gigantea* leaf, flower and stem was tested against *Gram positive bacteria* such as *B.subtillis, S.aureus* and *Gram negative bacteria* such as *E.coli, K.pneumoniae, P.aeruginosa and P.mirabilis*. The results confirmed that the Ethanol extract of *C.gigantea* flower showed more activity. The *in vitro* antioxidant properties of C.gigantea leaves, flowers and stems have been evaluated by various antioxidant assays, including 1, 1-diphenyl-2-picrylhydrazyl (DPPH), Ferric thiocyanate (FTC) method, Thiobarbituric acid (TBA) method, Superoxide Anion Radical scavenging assay, Hydroxyl radical scavenging activity, Metal chelating activity and Phosphomolybdenum assay. The present study suggested that the flower extract could be a potential natural source of antioxidants. The Antidiabetic effect of Ethanol extract from *Calotropis gigantea* flowers on RIN-5F Pancreatic cell line and normal Cell lines was evaluated by MTT assay. From the performed assay, the flowers shows greater activity on RIN-5F cell line and that means Ethanol extract of *Calotropis gigantea* flowers can be used as antidiabetic agents.

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Synthesis of Silver Nanoparticle from *Annona squamosa (L.)* Leaf Extract and Assessment of it's Antimicrobial Activity

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ABSTRACT

Green synthesis of silver nanoparticle (AgNPs) has gained a drastic importance in the field of nanotechnology, biotechnology, cancer biology and medicine. The synthesis of nanoparticles has shot into limelight because of its efficiency and minimal health and environmental hazards as compared to conventional chemical synthesis. The present study reports the green synthesis of silver nanoparticles from *Annona squamosa* leaf extract rapidly within 20 min. The synthesized AgNPs using *Annona squamosa* leaf extract was determined by UV–visible spectroscopy and was further characterized by FT-IR. Antibacterial efficacy of silver nanoparticles was also investigated by disc diffusion method and it was found that the antibacterial activity of silver nanoparticles is impressive in hampering the growth of E. coli.

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Beneficiary Effect of mint in GDM Placenta

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ABSTRACT

Gestational diabetes mellitus (GDM) is a prevailing pathological condition during pregnancy, characterized by glucose intolerance. Both patients with GDM and their offspring have greater risk to develop type 2 diabetes in later life with high chances of prenatal morbidity and mortality. Oxidative stress plays an important role in the pathogenesis of GDM and often results in the placental damage. Treatment with synthetic drugs during pregnancy complication like GDM may cause exacerbate effect to both mother and fetus. Hence the use of herbal drug with effective antioxidant property is inevitable. A common herb mint is known for its excellent antioxidant activity and hydroxyl radical scavenging activity. Hence the present study aims to investigate the efficiency of mint in regulating oxidant, antioxidant status, placental damage in normal and GDM placental tissue homogenate. It is ascertained by determining stress markers such as lipid peroxides, nitrite with simultaneous analysis of anti-oxidants such as TAC and GRR. Increased biomarkers of stress with an impaired antioxidant defense have been identified in the GDM placenta before incubation with mint. However incubation with mint significantly decreased the oxidative stress markers and increased the antioxidants defense in GDM placenta. Results achieved from the present study suggest the protective effect of mint extracts against oxidative stress and mint can be recommended as an alternative herbal remedy for GDM in pregnancy to manage oxidative stress.

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Toxic effect of hexavalent chromium and aluminium in fish I*ctalurus punctatus* grown in contaminated water and bioremediation by using dead fungal biomass.

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ABSTRACT

Fish serum may reflect status of many biochemical processes in the metabolism. Heavy metals may alter serum biochemical parameters in fishes. The present study investigated the toxic effect of Cr (VI) and Al (III) in fresh water fish *Ictalurus Punctatus* and neutralizes these heavy metals by using dead fungal biomass. Activities of serum ALT, AST, ALP, LDH, CPK, α-Amylase and Glucose concentration increased in Al and Cr exposed fish. Urea concentration increased in Al-exposed fish, although it decreased in Cr-exposed fish. The above study suggests that serum biochemical parameters could be used as important and sensitive biomarkers in eco toxicological studies concerning the effects of metal contamination and fish health. To remove these heavy metals from environment by using dead fungal biomass, this study was carried out by the adsorption range of metal ions Cr (VI) AND Al (III) in optimum pH 5.2 & 5.5, various concentrations of metal ions are completely adsorbed with in 8hours contact time.

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Phytoremediation of domestic sewage waste water of Gudiyattam town by using Microalgae *Chlorella vulgaris*

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ABSTRACT

The accumulation of wastes of domestic and industrial processes in the nearby water bodies results in water pollution. The wastewater discharged into the water bodies are hazardous to environment and cause various health problems in human beings. Eutrophication is one such major environmental problem caused due to the discharge of nutrient rich wastewater into the nearby water bodies. Excessive pollutants including nutrients affect aquatic lives and environment in various ways. There are certain plants capable of removing pollutants from water. Phytoremediation is an alternate way to reduce nutrients from contaminated medium. Microalgae can be used for phytoremediation to reduce the nutrient content in the wastewater due to the algae's ability to assimilate nutrients into the cells. The microalga *Chlorella vulgaris* can utilize the nitrogen and phosphorus in wastewater for its growth. Hence in the present study, microalga *Chlorella vulgaris* was used to determine the removal efficiencies of pollutants, such as chemical oxygen demand (COD), total nitrogen (TN) and total phosphorus (TP). The *Chlorella vulgaris* was cultured in the shake flasks that contained wastewater in the presence of artificial light in the laboratory. It removes the maximum percentage of TN and TP were within 82.1% and 90.9%, respectively. The *Chlorella vulgaris* which could not only bioremediate the wastewater, but also produce plenty of the microalga biomass that could be used for the exploitation of fertilizers, feed additives and biofuels. The optimum detention period for the maximum phytoremediation is found to varied within 10 and 14 days. Based on the laboratory scale study under controlled environment, it can be concluded that *Chlorella vulgaris* has the potential to reduce nutrient content of wastewater.

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Role of Epigenetics in Stem Cell

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ABSTRACT

Pluripotency of stem cells is due to three main factors: transcriptional regulation, epigenetic modifications and chromatin structures. Epigenetic modifications of core histone proteins including methylation, phosphorylation and acetylation, helps to maintain the chromatin structure. The level of chromatin compaction controls accessibility to genomic DNA and therefore has a key role in establishing and maintaining distinct gene expression patterns and consequently pluripotent fate of stem cells. The genome undergoes epigenetic modifications during development and differentiation, from an open euchromatin rich ESC to a more compact heterochromatin rich differentiated cell. Transcription factors bind to *cis*-regulatory elements and control gene expression in response to environmental cues. Promoters active in early developmental stages tend to be GC-rich and mainly use H3K27me3 for repression in non-expressing cells. Whereas genes differentially expressed in later stages are largely CG poor and use DNA methylation for silencing. Transcriptionally active chromatin of stem cells is usually hyperacetylated and hypomethylated. The hyperdynamic chromatin of ESCs has loosely bound histone proteins such as H3, H2B, etc. with very short residency times. Differentiation leads to loss of this dynamic nature by restructuring of the genome. A better understanding of epigenetics will facilitate identification of deficiencies in current approaches, leading to more faithful differentiation strategies as well as providing insights into the rewiring of human regulatory programs during cellular transitions.

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Protein Production from *Aspergillus niger* using Chemical and Enzymatic treatment of Rice Husk

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ABSTRACT

Microbes which possess high content of protein and harmless when consumed are being used by humidity as food supplement. The single cell protein (SCP) refers to any unicellular source of protein including yeast, bacteria, fungi and algae. The value of SCP is in its uses a nutritional supplement where conventional protein. Rice husk is a paddy field waste contains variable ingredients like mineral, carbohydrates, nitrogen and decomposed to fermented sugars by chemical and enzymatic methods. These fermented sugars were supplemented with mineral medium for the growth of *Aspergillus niger* and Single Cell Protein production. Production of SCP of*Aspergillus niger* in rice husk basal media. Identification and estimation of protein in *Aspergillus niger.*Inoculum preparation, spores were harvested from a week old A*spergillus niger*. The rice husk (lingo-cellulosic material) was degraded into simple compounds (fermented sugars) by chemical and enzymatic treatment. Determine the acid concentration of the reagent by titrating with 1N sodium hydroxide to phenolphthalein and point. Demonstrate the single cell protein yield is higher in case of per chloric acid treated rice husk medium than sulphuric acid and ammonium hydroxide. A higher yield of SCP production from A*spergillus niger* was possible by acid/alkali treated rice husk. Though utilization SCP production is emerging field encouraging results are obtained and some success is achieved in improving the overall protein yield by supplement of rice husk based medium with sulphuric acid and sodium hydroxide sources for Single Cell Protein production.

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Assessment of Bioactive Principles in *Annona squamosa* Leaf Extract

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ABSTRACT

Annona squamosa Linn, commonly known as Sugar apple, belonging to the family Annonaceae, is said to show varied medicinal effects, including insecticide, antiovulatory and abortifacient. Hence the present investigation was carried out to determine the chemical composition of *Annona squamosa* leaf extract using Gas Chromatography–Mass Spectrometry technique, while the mass spectra of the compounds found in the extract was matched with the National Institute of Standards and Technology (NIST) library. GC-MS analysis of Annona squamosa leaf extract revealed the existence of Sodium benzoate (27.50%), 4, 4-Tert- Butylcalix(4)arene (12.34 %), 4, 4- Dimethylcholesterol (10.30%), Butyloctylpthalate (9.67%), stigmasterol acetate (2.92%), isoamylacetyate (2.29%) justifying the use of this plant to treat many ailments in folk and herbal medicine.

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Myricetin modulates hyperglycemia mediated oxidative stress in high fat fed – streptozotocin induced type 2 diabetic rats

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ABSTRACT

Diabetes mellitus (DM) is a multifactorial, multisystemic endocrine disorder often characterized by persistent elevation in both fasting as well as postprandial glucose levels resulting in disturbances of carbohydrate, lipid and protein metabolism. Flavonoids as potent antioxidants may prevent the progressive impairment of pancreatic β-cell function due to oxidative stress and thereby reduce the complications of type 2 diabetes. Among the flavonoids, myricetin is a major component found to be present in various traditional medicinal herbs. The present study was designed to evaluate the antihyperglycemic effect of oral administration of myricetin (5mg/kg b.w) for 30 days on high fat diet low dose streptozotocin induced type 2 diabetes in experimental rats. Oral administration of myricetin significantly decreases the levels of fasting blood glucose, glycosylated hemoglobin and significant increase in the levels of plasma insulin. Upon treatment with myricetin, the diabetic rats showed significant improvement in enzymatic and non – enzymatic antioxidants. These findings demonstrate that myricetin posses both significant antihyperglycemic as well as antioxidant properties.

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Studies on phytochemical screening and Antibacterial activity from leaf extract of *Gymnema sylvestre* R. Br

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ABSTRACT

The present study was performed to investigate the phytochemical screening and antibacterial activity from the leaf extract of *Gymnema sylvestre*. The phytochemical analysis revealed the presence of active ingredients such as steroids, saponins, phenols, flavonoids, terpenoids, alkaloids and tannins in the leaf extract of *Gymnema sylvestre* followed by others. Different concentrations of ethanolic extracts were tested using the agar disc diffusion technique for the activity against *Staphylococcus aureus, Bacillus subtilis, Bacillus cereus, Pseudomonas aeruginosa*. It was found to be inactive against *Escherichia coli.* The methanol extract from dry powdered leaf extract of *Gymnema sylvestre* had superior level of antimicrobial activity.

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Galangin ameliorates inflammatory changes in pancreas -a study in rats administered ethanol and cerulean

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ABSTRACT

To investigate whether galangin(GA), a natural flavonoid of the rhizome *Alpinia galanga* modulates the components of NLRP3 inflammasome, a multi protein complex which mediates inflammation by using rat model of experimental pancreatitis induced by administering ethanol(EtOH) and cerulein. For the study, adult male albino Wistar rats were divided into four groups. Group 1 and 2 served as control and received normal diet for 5 weeks. Group 3 and 4 received an isocaloric diet and ethanol (8-12 g/ kg body weight/day) orally and also cerulein (20µg/kg body wt.) intraperitonially for the last 3 weeks of the experimental period. In addition, group 2 and 4 were administered 100µg/kg body wt. of galangin in corn oil orally by intragastric intubation for the last 3 weeks of the experimental period. The mRNA expression of the NLRP3 components, apoptosis-associated speck-like protein (ASC), pyrin (PYD), and caspase-recruitment (CARD) domains, caspase-1 and the proinflammatory cytokines IL-1β and IL-18 were evaluated by real time quantitative PCR (RT-PCR) technique. Histopathological examination of pancreatic tissue was also carried out. A significant increase in the mRNA expression of ASC-CARD, ASC-PYD, caspase-1, IL-1β and IL-18 were observed in EtOH and cerulein treated rats when compared to control rats. The mRNA expression of these genes were substantially downsized in the galangin supplemented (group 4) rats. The results were supported by histological observations. The anti inflammatory effect of galangin is well evidenced by the results of this study which may be due to its interaction with ASC-CARD and ASC-PYD domains which activate caspase-1 to promote proinflammatory cytokine maturation. Also the observations suggest that galangin downregulates the proinflammatory cytokine activation thereby prevents inflammation and minimizes tissue damage.

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A structural basis studies of HLA-cw*0801 allele associated Nevirapine (NVP) drug hypersensitivity syndromes

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ABSTRACT

Idiosyncratic adverse drug reaction (ADR's) are the common and a potentially life threatening problem in drug therapy. Patient's experience unnecessary morbidity and mortality while many effective drugs are withdrawn because of ADRs in patients. Recent studies have revealed that HLA alleles are the major genetic determinants of drug hypersensitivity but the insights of underlying molecular mechanism remains unclear. Nevirapine a non-nucleoside reverse transcriptase inhibitor (NNRTIs) used as a cornerstone for treatment of human immunodeficiency virus (HIV) in India. Human HLA-CW*08.01 allele has been significantly associated with nevirapine-induced hypersensitivity. Our aim was to identify the genetic relationship between Nevirapine hypersensitivity and HLA-Cw*08.01 allele. This would lay the groundwork for biochemical and structural studies that define binding in the antigen-binding cleft in a manner that alters the HLA-bound peptide repertoire. *In silico* docking studies was used to dissect the mechanism of NVP non-covalent binding within the antigen binding cleft of HLA- HLA-Cw*0801 alleles. We used the DS: Ligand fit module to dock NVP on the HLA into the Binding pocket, and we consistently observed NVP interaction with residues on the pocket. The binding is stronger without the presence of peptide. The HH12 atom and atom HH22 of ARG48 interacting with O_1 atom of Nevirapine by forming a hydrogen bond, with the bond distance of 2.05776 A^o and 2.79859 A^o respectively. There is an amide Pi stacked interaction between NVP and SER 52 of HLA-Cw*08.01 and Pi Alkyl interaction of PRO235 and NVP further accelerating stability of NVP and HLA allele interaction; thereby altering HLA allele's repertoire for self-peptides presentation to T cells. Thus self-peptides may bind at the termini pockets of the binding cleft of HLA allele and loop over NVP to interact with the TCR and causing alloreactive T cell response. This study not only provides new perspectives of the mechanisms of HLA-associated drug hypersensitivity but also a preclinical screening of the interaction between HLA and the NVP sheds insight on the improvement of drug safety.

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Acalypha indica- Its Antimicrobial activity – A Review

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ABSTRACT

Plant based drugs are being used worldwide in traditional medicines for treatment of various diseases. India, being the mother land of Siddha and Ayurveda medicine, had explored the herbs for the successful treatment of various dreadful diseases. *Acalypha indica* Linn. (Tamil - Kuppaimeni; Sanskrit – Arittamanjarie –Euphorbiaceae family) is a common annual shrub that grows in the tropical India and recognized as a medicinal plant in traditional Indian system. The plant possesses high medicinal value and used widely in all the three systems (Siddha, Ayurveda and Unani) of Indian traditional medicine. It is used in the treatment of cough, respiratory problems, dyspnosea, intestinal infections, rheumatoid arthritis, skin infection and wounds. Besides these, it is also used as a laxative and pain killer. Earlier reports recorded the antioxidant, analgesic, anti-inflammatory and wound healing activities of the extracts of *A. indica*. The extract possesses antimicrobial activity against bacteria, fungi and helminthic parasites. In addition they possess larvicidal and ovicidal activities and neutralize the *Viper russelli* venom induced lethality, cardiotoxicity, neurotoxicity. The antibacterial activity of *Acalypha indica* was investigated against three strains of human pathogenic bacteria viz., *Bacillus subtilis*, *Staphylococcus aureus* and *Klebsiella pneumoniae* using ethylacetate, hexane and methanol extracts of leaves, stem and roots of *Acalypha indica*. The ethylacetate extracts of leaves and roots inhibited the growth of all the three selected bacterial species. The cardioprotective role of methanolic extract in rats with induced myocardial infarction using isoproterenol was investigated. The levels of inflammatory marker,cardiac markers, lipid peroxidase activity were restored to normal levels in MI induced rats pretreated with leaf extract. In addition, the histopathological analysis of the heart tissue confirmed the protection of tissue damage by *A.indica*. The *A. indica* leaves possess possibly active metabolites that protects the cardiac tissue from cardiovascular diseases. The present review deals with the medicinal properties of *Acalypha indica* (L) and its potential antimicrobial and therapeutic applications.

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Growth inhibitory role of *Psidium guajava leaf* extracts towards *Streptococcus mutans* in Dental caries

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ABSTRACT

Herbs are nature's healing gift to human kind. Use of herbs and herbal remedies has been an integral part of the Indian life and culture from time immemorial. It is common in India to goggle decoction of guava leaves for relieving toothache, swollen gums and oral ulcers. Modern studies revealed that guava leaves contains antioxidants, anti-inflammatory agents, antibacterial, and other beneficial tannins. Guava plant leaves are best known as a natural pain reliever. There are numerous studies that have documented the benefits of guava leaves in controlling blood pressure, lowering cholesterol, battling diabetes, combating cancer and protecting prostrate. *Streptococcus mutans (S.mutans)* is a normal flora bacteria found in human oral cavity and it is the predominant cause for dental caries. This study attempts to present the effectiveness of guava leaves extract and *in vitro* inhibitory effect of Psidium guajava by its active components from aqueous and different organic solvents towards *Streptococcus mutans* in dental caries. The phytochemical analysis revealed many bioactive compounds and structural characteristics of the identified phytochemicals have been confirmed by GC-MS analysis. The qualitative analysis of GC-MS found some of the major components viz Azulene, Copaene, Caryophyllene, Alloaromadendren oxide etc. The antibacterial activity of Psidium guajava leaf extracts with different concentrations were determined by BHI agar disk diffusion method and zone of inhibition has been calculated. In addition, the possible synergistic effects when associated with antibiotics were studied. The salivary bacterial sensitivity testing has been carried out with saliva samples before, during and after utilization of aqueous extract as oral mouth wash.

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Free radical quenching activity and polyphenolic constituents of *Anethum graveolens*

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ABSTRACT

Free radicals have been implicated in the etiology of a huge number of life threatening diseases. The most effective way to eliminate free radicals which cause oxidative stress is with the help of antioxidants. Antioxidants, exogenous or endogenous, synthetic or natural, can be effective in preventing free radical formation by scavenging them or promoting their decomposition thereby suppressing such disorders. Numerous studies have described the health beneficial, antioxidant potential and free radical scavenging abilities of plant polyphenols. In the present study, the medicinal plant *Anethum graveolens* belonging to the family Umbelliferae was selected to assess its *in vitro* antioxidant potential and polyphenolic constituents. This plant is a common household remedy against a variety of gastrointestinal disorders, also used as spices and condiments in foods for their flavour, aroma, and preservation. It is also a stimulant, emmenagogue and galactagogue. The essential oils of these plants have been reported to possess antimicrobial activity. Thus, to provide a scientific justification for these traditional remedies, the present study was planned to assess the antioxidant potential using aqueous and successive organic extracts in five different *in vitro* models for antioxidant studies. Phytochemical screening and HPLC determination of polyphenols were also carried out to identify the major active phytoconstituents. The preliminary phytochemical screening of the extracts of *Anethum graveolens* indicated the presence of flavonoids, glycosides, tannins and saponins while quinones and anthraquinones were absent. The *in vitro* antioxidant studies have proved the aqueous (AqAG) and methanolic (MAG) extracts of the plant to have maximum free radical scavenging effects. Hence they were subjected to HPLC analysis to determine the phenolic content. The results indicated both AqAG and MAG possessed a high content of polyphenols (7.03 and 7.45 mg/g), constituents being gallic acid, ellagic acid, vanillic acid, coumaric acid and ferrulic acid. A fair correlation between total phenolic content and *in vitro* antioxidant activity was thus observed.

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Hypocholesterolemic activity of *Enicostemma axillare* in fructose induced hyperlipidemic rats

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ABSTRACT

Hypercholesterolemia, the leading cause for the development of various diseases made pharmaceutical companies to turn towards the herbal products with fewer side effects. In the present research, the hypocholesterolaemic activity of *Enicostemma axillare* (EA) has been evaluated. The hypocholesterolaemic effect of 85% methanolic extract of EA was evaluated in fructose induced hyperlipidemic animals. Antioxidant enzymes such as catalase, TBARS, GSH, GST and lipid profile such as cholesterol, LDL, VLDL, HDL and triglycerides were analysed in heart and plasma samples. Administration of EA decreases the lipid profile and TBARS significantly ($p<0.05$). Likewise, EA administration increases the antioxidant and HDL significantly ($p<0.05$). The results reveal that EA can be used as a potent hypocholesterolemic and antioxidant agent in pharmaceutical industry.

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Anti-inflammatory and analgesic effect of *Cardiospermum halicacabum* (Linn)

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ABSTRACT

Cardiospermum halicacabum (Linn) (CH) is widely used as a folk medicine for rheumatism. In this study, HPTLC profile and pharmacological activity in terms of analgesic and anti-inflammatory profile of 75 % ethanolic extract of CH is evaluated. The analgesic activity is evaluated in different methods using hot plate and tail immersion. The anti-inflammatory activity is evaluated by carrageenan induced rat paw edema. HPTLC profile showed the presence of 6 peaks in the mobile phase like Ethylacetate : Methanol (7:3) with the maximum peak area 25.16 %. In both the methods of analgesic test, significant difference has been observed at 150 mg/kg b.wt. of extract ($p<0.05$). CH extract also exhibits a significant ($p<0.05$) anti-inflammatory activity. In conclusion, CH's 75% ethanolic extract exhibits both analgesic and anti-inflammatory activity.

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In vitro proton-pump inhibitory effect of the leaves of *Breynia retusa*

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ABSTRACT

Ulcer is a common problem with increasing incidence and prevalence attributed to several factors encountered during day to day life, such as stress, exposure to bacterial infection and the use of non steroidal anti inflammatory drugs. Mucosal damage, an initial step in ulcer development has been correlated with oxidative stress by reactive oxygen species (ROS) generation and hyper-secretion of HCl through H^+,K^+-ATPase action. Thus a modest approach to control ulceration may be by scavenging ROS in the stomach and inhibiting H^+ K^+ATPase, a proton-pump for acid secretion in the parietal cells of gastric mucosa; although several antisecretory drugs such as H^+ K^+ATPase inhibitors- omeprazole, lansoprazole, ranitidine, famotidine and histamine H^2 receptor blockers are being used to control acid secretion, they produce adverse side effects on human health. Although, the introduction of proton-pump inhibitors for anti-ulcer therapy had revolutionized the treatment of peptic ulcers, there is still no complete cure for this disease. It has been shown that long term use of these drugs leads to various adverse and side effects. Ineffectiveness of different drug regimens and resistance to drugs have also been reported. Thus, there is an urgent requirement to identify more effective and safe anti-ulcer agents. A widespread search has been launched to identify new anti-ulcer therapies from natural sources. Herbs, medicinal plants and crude drug substances are considered to be a potential source to combat various diseases including gastric ulcer. Breynia species possess various medicinal values and the folklore claims of those medicinal values have been proved by various researchers. However, there are very few reports on the medicinal uses of *Breynia retusa*. The objective of our study was to analyse the inhibitory effect of the aquesous extract of the leaves of *Breynia retusa* on gastric H^+ K^+ATPase and thus establish its gastroprotective effect indirectly. The percentage of inhibition of proton-pump of the extract was 67% and the effect was comparable with the standard proton- pump inhibitor drug, omeprazole which exhibited 71% inhibition. The study thus opens a new avenue for an exhaustive investigation on the *in vivo* use of *Breynia retusa* as an anti-ulcerant.

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Carbon nanotubes: Approaches in Modern therapeutics

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ABSTRACT

Health effects of nanoparticles are attracting considerably and increasing the concern of the public and government worldwide. Carbon nanotubes represent one of the fastest developing nanoparticle materials with production set to increase rapidly as a consequence of the useful properties of this material. For example, CNTs are used for the delivery of antibiotics to different types of cells by selective transport through the membrane and vector in gene delivery. It can transport various types of proteins into the cells. CNTs have been tried to deliver anti-cancer drugs to human cancer cells. Functionalized-CNTs are being extensively explored in advanced biotechnological applications ranging from molecular biosensors to cellular growth substrates. CNTs might offer a non-toxic molecular ship to deliver the drugs safely to fragile bones. It can be used as a artificial kidney. The nanotube surface acts as the sensor by detecting the shape change of the DNA as it responds to the presence of target ions. CNT-plasma polymer-based amperometric biosensors for ultrasensitive glucose detection have been fabricated. CNT can be used as multifunctional biological transporters and near-infrared agents for selective cancer cell destruction. It can destroy the kidney tumors. Hence, conclusion may be made that carbon nanotubes holds hope for better diagnosis and treatment of various diseases, thus serving modern health care in a better way.

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Enhancing the Production of Streptomycin from *Streptomyces Sp.* by Mutation and its Molecular Characterization

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ABSTRACT

The main objective of the work was to isolate Streptomyces sp. from soil and optimize the organism on the basis of pH, temperature, effect of carbon source, effect of nitrogen source etc. From both the methods it can be said that pH 4 and 5 is found to be the optimum pH for the *Streptomyces sp.* and an optimum temperature at 25˚C and it is observed that maltose was the effective source of carbon for the organism. Yeast extract and $NaNO_2$ were found to be effective nitrogen sources for the organism to grow. The organism isolated was mutated and the antibiotic streptomycin was produced. The purification of streptomycin was done with the help of activated charcoal. Concentration of streptomycin produced in starch casein broth after mutation was determined by HPLC analysis and characterization of the mutant was carried out by PCR technique. By HPLC analysis it was found that 0.232mg of streptomycin was produced while the PCR revealed the mutation was heritable.

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Antibacterial activity of *Pongamia Pinnata* Linn and *Moringa Oleifera* Lam flower extracts against selected Bacterial Strains and their comparitive evaluation

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ABSTRACT

Moringa oleifera Lam and *Pongamia pinnata* Linn were the two well known tropical trees with a rich world wide histroy of folklore medicine. Attempts to revisit the medicinal potential of these trees are the need of the hour with emerging drug resistance among common pathogens. In this regard few common pathogens have been considered for testing against the possible antibacterial activity of the concerned plants. The flower extracts of the plants were examined for antibacterial activity against *Escherichia coli*, *Klebsiella pneumonia, Psuedomonas aeruginosa* and *Staphylococcus aureus* respectivley *P.pinnata* extract (aqueous, ethanol and fresh juice) seems to exhibit more effective antibacterial activity against *E.coli,* 65.25% more effectively than *M.oleifera* extracts and almost on-par with the control antibiotic. *S.aureus* also seems to exhibit more sensitivity to *P.pinnata* extracts, while better antibacterial activiy against *K.pueumoniae* and *P.aeruginosa* could be seen with fresh juice extract of *P.pinnata* and solvent extract of *M.oleifera* respectively. The ethanol extract of the flowers were subjected to phytochemical analysis which indicated the presence of alkaloids, flavonoids and polyphenols in the extracts. The study asserts the prospective role of *Pongamia* and *Moringa* flower extracts as a source of natural and broad spectrum antibacterial compounds and opens up the need for further research on their use in the treatment of various bacterial infections and to discover the new bioactive compounds which can also be used for prophylactic treatment.

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Studies on the Isolation and Charaterization of Potential Growth Promoting Rhizobacteria from Non-Rhizhospheric Soil.

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ABSTRACT

Extensive use of fertilizers has undoubtedly brought about a steep increase in the food production, without much concern for sustainability. Only 50% of the applied fertilizer is taken up by the crop plants the rest is lost as volatilization, leaching and denitrification causing huge economic losses as well polluting the environment. Plant growth promoting rhizobacteria (PGPR) can be defined as an indispensable part of soil biota, which when grown in association with the host plants can stimulate the growth of the host. A potential bacterial strain with multiple plant growth promoting attributes was isolated and characterized. Plant growth promoting traits were evaluated by determining the P-solubilisation efficiency, Indole acetic acid production, HCN and siderophore production. The strain was found to be gram negative, exhibiting growth at 10-40°C (optimum 37°C) with a pH range of 6-12. 16S rRNA gene sequencing of the strain provided confirmation of the isolate as Pseudomonas stutzeri PIMS6. Under in-vitro conditions the isolate was found to produce indole acetic acid, P-solubilization and hydrogen cyanide, phosphate solubilization was accompanied by a decrease in pH from 7.0<3.0. Hence the Pseudomonas stutzeri strain emerged as a promising plant growth promoting bacteria showing multiple PGPR attributes. Studies on this isolate further will provide the basis for formulation and field applications.

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Sabja Seeds- Super Food for Sports Persons.

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ABSTRACT

Sabja seeds or sweet basil seeds (*Ocimum basilicum*) belong to mint family, native to India. The health benefits of basil leaves are well known and are continuously utilized for thousands of years in Siddha and Ayurvedic medicines, though basil seeds are less known. Sabja seeds are tiny seeds but exhibit exceptional nutritional and therapeutic properties. The seeds are power packed with carbohydrates, soluble fiber, beta carotene, lutein and zeaxanthin. It is an excellent source of iron, calcium, potassium and folates. The boron present in the seeds helps in the absorption and assimilation of calcium and prevents osteoporosis in female athletes. It also possesses strong antioxidant and antibacterial property, which is very useful for players to avert free radical damage and infections. Mucopolysaccharides in sabja seeds help in avoiding fall in blood sugar levels, which is the main cause of dizziness and reduced performance among sportspersons. Being hydrophilic in nature, the sabja seeds hold ten times their weight of water when soaked and forms a gel, so that when consumed keeps the body rehydrated. Retention of moisture enables the body to absorb nutrients better while in the mean time maintains electrolyte balance. The present study aims to study the rehydrating property of sabja seeds by formulating a sports drink with the addition of sabja seeds at different amounts. A natural isotonic sports drink was prepared with fruit juice, tender coconut water, jaggery and electrolytes. Sabja seeds were added at 2g, 4g and 6g per 100ml of sports drink. The drink with the addition of 4g/100ml was highly accepted and tested for its efficacy by 15 sports persons. The players who consumed the sabja seeds added drink, felt energetic and less fatigued than before and their control counterparts. Hence sabja seeds, an inexpensive, super food might be added to the sports drinks to enhance stamina, performance, immunity and health of the sportspersons.

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An Analytical Study on Barley Beta Glucan – a functional food additive.

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ABSTRACT

Barley is one of the most important cereal foods all over the world. It is currently used as feed for animals as well as food for human consumption. In recent years, the importance of barley grains as a nutraceutical ingredient has increased because of their high content soluble fiber, especially as a rich source of β-glucan. The most documented nutritional benefit of β-glucan is flattening postprandial glucose, insulin rise and cholesterol control. But the potential use of β-glucan is often limited because the consumption of products containing barley grain or flour is influenced by their negative organoleptic quality. Hence the objective of the present study was to extract beta glucan from barley and to investigate its properties to be utilized as a functional additive in foods. In the present study, β-glucan content in whole barley grain flour was identified and it was isolated by adopting Hot Water Extraction method. The isolated extract was further analyzed for the β-glucan content to determine the yield and recovery. Also the chemical composition (Proximate analysis), Total, Insoluble, Soluble fibre, functional properties (Water binding capacity, foaming capacity, viscosity) and biological properties (Antibacterial and Antioxidant activity) of the beta glucan was investigated. It was evident from the study that the β-glucan extracted from hot water extraction method has both scientific and commercial value provided to be a cheap and promising additive and have a great potential to be used as a functional ingredient in food products.

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A Study on Oral Candiadis and probiotic activity against the isolates among the Leprosy patients

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ABSTRACT

Leprosy, also known as Hansen's disease, is a chronic infectious disease that primarily affects the skin, the peripheral nerves, the upper respiratory tract, and the eyes. The causative agent is an acid-fast bacterium *Mycobacterium leprae.* In the present study fifty volunteer leprosy patients of Government Leprosy Rehabilitation Centre were selected for oral sample collection. The study population includes 33 male and 17 female leprosy patients. Oral swabs were collected to identify the oral candidiasis, among leprosy patients. *Candida albicans* and *C. tropicalis* were isolated from oral samples using Hichrome Candida agar. *C. albicans* was found to be highest in occurrence compared to *C. tropicalis* leading to the major cause of oral condition.Antibiotic sensitivity test was done by Kirby-Bauer method using selected antibiotics such as Ketaconazole, Itraconazole, Fluconazole and Co-trimazole against oral candidiasis.All the fungal isolates were found to be multi drug resistants due to continuous intake of chemotherapeutic drugs that favours the state of tolerance to such antibiotics. In the present study Probiotic exhibited significant sensitivity and paves the way to reduce the intensity of pathogenesis caused by candida. Probiotic act as an effective therapeutic tool to fight against candidiasis.

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Pytochemical characterization and antimicrobial effect of *Kappaphycus alvarezii* (sea weed) against chosen isolates

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ABSTRACT

The search for plants with antimicrobial activity has gained increases importance in recent time, due to growing worldwide concern about the alarming increase in the rate of infection by antibiotic- resistant microoranganisms. The defence mechanism against antibiotics is widely present in bacteria and become a world health problem. In order to compact these important health challenges, discovery of the new medical agents with novel modes of activity is imperative. In recent year, seaweeds also known as marine algae, a part of the marine plant kingdom have attracted a lot of attention from the scientific community. Sea weeds are potentially good sources of protein, polysaccharides and fibre and metabolically active components, having important functional activities such as antioxidant, anticoagulant, antimitogen and antitumor activity. *Kappaphycus alvarezii,* one of the largest tropical red alage subjected to the present study collected from the Gulf of Mannar coast. The preliminary phytochemical screening of the crude extract from ethanol and chloroform of *Kappaphycus alvarezii*revealed the presence of significant metabolically active compounds with antimicrobial property. The antimicrobial activityof the crude extracts of the *Kappaphycus alvarezii* against Gram positive and Gram negative clinical isolates such as *staphylococcus, E.coli, salmonella, vibrio* showed significant effect, based upon the concentration while compared with commercial antibiotics dics. To overcome the impact of antibiotic resistant strategy of microorganisms, the seaweed may implement as effective therapeutic agent to combat against the clinical isolates.

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Usage of Chia seeds for designer Food

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ABSTRACT

The chia seed which is commonly known as *salivia hispancia*, is a species of flowering plant in the mint family. It is an annual herb growing 4-8 cm long and 3-5 cm wide. The chia meaning oily is coloured with brown, grey, black and white. The chia seeds contain dietary fibre which reduces cholesterol, protein which is easily digested and absorbed and healthy supply of important vitamins and minerals like boron, calcium, copper, iron, magnesium, manganese, niacin, phosphorous and zinc. Two tablespoonful of chia provides seven grams of fiber, four gram of protein, and it is a complete protein source. The little chia seeds provide a rich source of omega-3 fatty acids which is essential for maintaining healthy cholesterol level, brain development, and immune system and it has anti- inflammatory effect. For vegans, it is a good substitute for egg and fish because it contains omega-3 fatty acids like Eicosa pentanoic acid , Dicosa hexanoic acid and Alpha linolinic acid.

The chia reduces the risk of cardiovascular disease, allergies, thyroid, diabetes, rheumatoid arthritis and high blood pressure level. Regular consumption of chia seeds aids in digestion, treats cold, cures respiratory disorders, stress reliever and prevents signs of ageing, skin diseases, improve metabolism, increase lean muscle mass, lower unhealthy cholesterol and make death of tumour cells. The chia can be used in a wide variety of dishes including soups, fresca, cereal, yogurt, smoothies, salad, oats bar and baked goods. The chia can be stored whole or powder for a long period of time without getting rancid.

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Study on the effect of different plant growth hormones on callus formation of explants of *Acalypha indica* on MS media.

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ABSTRACT

Plant tissue culture is one of the most rapid growing areas of biotechnology because of its high potential to develop improved crops and ornamental plants. *Acalypha indica* of Euphorbiaceae family has several medicinal properties like cathartic, anti-hermitic expecetorant, emetic, anodyne and hypnotic. The medicinally useful parts of the *Acalypha indica* includes leafs, roots, stalk and flowers. The major constituents present in *Acalypha indica* are alkaloids, acalypus. The aim of the study is to produce callus culture of *Acalypha indica* explants such as leaf, node and inter-node on MS media. The results were observed is callus on the 8th day of inoculation.

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Antibacterial effect of different Honeys on bacterial isolates from wound infections

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ABSTRACT

Antibacterial activity: Anything that destroys\reduces certain types of Bacterial growth. Hence certain bacteria cannot reproduce further. The Antibacterial activity in honey is due to the enzymatic production of Hydrogen peroxide. Honey: It is a sweet and viscous fluid produced by honey bees derived from the nectar of flowers. It has a similar composition to granulated sugar 50% fructose and 44% glucose and approximately the same relative sweetness; 97% of the sweetness of sucrose. The purpose of this presentation is to find the" Anti -bacterial effect of different honey on bacterial isolates from wound infection". The methodology includes isolation of organisms from wound infection by swabbing method. These isolates were identified by biochemical and staining techniques and were tested for anti bacterial activity by standard methods. The result shows, that all the isolates were found be sensitive except one isolate. The MIC concentrations were varied for each isolates which showed positive result. . This project shows that the honey especially raw honey can be used to treat the wound infection which is not having any harmful chemicals.

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Microbial infections from public telephone receivers at Chennai and their control measures.

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ABSTRACT

India is third largest country in telephone networking next to china and Korea. This topic also helps us to know about microbial content in telephone receivers (indoors and outdoors) landline and mobiles which can spread from one person to another. This study aims to isolate and identify the microorganisms present in the public telephone receivers, to prepare the antimicrobial agents with plant extracts, to compare the efficacy of plant extracts and suitable chemical disinfectant and application of preventive measures and their observations. Samples were collected and the microbes were identified by using standard microbiological tests. The effect of using extracts of neem and chemical disinfectant showed promising results.

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Probiotics - A Boon to Mankind

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ABSTRACT

The WHO'S 2001 definition of probiotics is "live microorganisms which, when administered in adequate amounts, confer a health benefit on the host". Probiotics are most often used to promote digestive health. Because there are different kinds of probiotics, it is important to find the right one for the specific health benefit you seek. The most common probiotic bacteria come from two groups, *Lactobacillus* or *Bifidobacterium*, although it is important to remember that many other types of bacteria are also classified as probiotics. Probiotics have to be alive to be administered. Reasearch into the potential health effects of supplemental probiotics included the molecular biology in the genomics of *Lactobacillus* in immune function, cancer and antibiotic associated diarrhoea, traveller's diarrhoea,Pediatric diarrhoea, inflammatory bowel disease and irritable bowel syndrome. Other potential uses for probiotics include maintaining a healthy mouth, preventing and treating certain skin conditions like eczema, promoting health in the urinary tract and vagina, and preventing allergies (especially in children).It is generally thought that most probiotics are safe. They may be taken by people without a diagnosed digestive problem. Their safety is evident since they have a long history of use in fermented foods like yogurt. Some probiotics may interfere with or interact with medications. Your doctor will be able to help you determine if probiotics are right for you based on your medical history.

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Study on Production of Bacteriocin by *Lactococcus lactis* MTCC440

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ABSTRACT

The present study deals with the production, purification and molecular weight determination of bacteriocin particularly Nisin from *Lactococcus lactis* MTCC 440 and its antagonistic activity against various pathogens were assessed. *Lactococcus lactis* MTCC 440 strain were screened for production of Nisin in M-17 broth. The crude extract obtained in M-17 broth was precipitated using ammonium sulphate method. The Nisin so obtained was partially purified by dialysis. Further the bacteriocin purified was separated by SDS PAGE and its molecular weight was found to be 3kDa. Antibiogram studies showed inhibition against *Staphylococcus aureus* (20mm), *Micrococcus luteus* (11mm) and *Bacillus circus* (11mm). Thus the purified Nisin can be used as a preservative in food industries.

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Screening of antibiofilm and anti-quorum sensing activity using *Vitex trifolia* against pathogens causing infections in Human, aquatic and Soil.

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ABSTRACT:

The focal intent of this study was to find out an alternative strategy for the antibiotic usage against bacterial infections. The quorum sensing inhibitory (QSI) activity of various edible sources especially *Vitex trifolia* collected from India was evaluated against Acyl Homoserine Lactone (AHL) mediated violacein production in *Chromobacterium violaceum* (ATCC 12472), CV026 (violacein inhibition assay), control of virulence gene expressions in *Serratia marcescens* (PSI) isolated from urinary tract infection, *E.coli* collected from soil, Control of bioluminescence in aquatic pathogens like *Vibriyo Harveyi, Vibriyo parahaemolyticus, Vibriyo vulnificus (*Bioluminescence assay*)* and control of (EPS) exopolysaccaride production in *Proteus mirabilis* (Swimming & Swarming motility assay). Naturally edible sources were targeted for the inhibition of quorum sensing activity in bacterial pathogens. Out of 10 medicinal plants tested, the methanol extracts of *vitex trifolia (12mg/ml)* inhibited the AHL mediated communication in bacteria. Further, these extracts inhibited the AHL dependent prodigiosin pigment, virulence enzymes such as protease, hemolysin production and biofilm formation in *S. marcescens* (PS1) (Prodigiosin inhibition assay). However, these extracts were not inhibitory to bacterial growth, which reveals the fact that the QSI activity of these extracts was not related to static or killing effects on bacteria. Based on the obtained results, it is envisaged that the methanol extract of *Vitex trifolia* could pave the way to prevent quorum sensing (QS) mediated bacterial infections in human urinary tract. Further studies in inhibition of Quorum sensing activities in bacteria especially in pathogens causing infection in environment can be reduced by providing alternative agents for antibiotic usage.

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A Study of Chlorophyll (Chl) of some medicinal plants- Its antibacterial and antioxidant activities

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ABSTRACT

Chlorophyll is a chorin pigment, which is structurally similar to and produced through the same metabolic pathway as other porphyrin pigments such as heme. At the center of the chorin ring is a magnesium ion. In the present study, the chlorophyll was extracted from the leaves of some medicinal plants and characterized by UV-Visible spectroscopy, Thin layer Chromatography and column chromatography. The Antibacterial and antioxidant activity of chlorophyll was studied. The antimicrobial activity of chlorophyll extracts was evaluated with antibiotic susceptible and resistant microorganisms. Chlorophyll extracts from the following plants were utilized: Melothira Maderaspatana, clitoria ternatea, Boerhavia Diffusa, Pongamia Pinnata, Aegle Marme, phyllathus fraternus, Mimosa pudica, Pisonia grandis and Acalypha indica. The antibacterial activity of extracts of medicinal plants was tested against *Escherichia coli, Pseudomonas aeruginosa, Vibrio cholera, proteus vulgaris, Psedomonas fluorescens.* The results showed that the remarkable inhibition of the bacterial growth was shown against the tested organisms.

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Probiotic agents and infectious diseases: A modern perspective on a traditional therapy

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ABSTRACT

Probiotics are defined as viable microorganism that have a beneficial effect in the prevention and treatment of specific pathological condition when they are ingested, as a live microbial feed supplement which beneficially affect the host animal by improving its intestinal microbial balance. The microorganism most frequently used as a probiotic agents are Latic acid bacteria particularly Lactobacillus species including Lactobacillus rhamnosus , Lactobacillus reuteri, Saccharomyces boulardii, seems to be promising agents for the amelioration of the course of acute diarrhea in children when used therapeutically. Evidence is emerging for the use of probiotics in other gastrointestinal infections, prevention of postoperative bacterial translocation, irritable bowel syndrome and in both ulcerative colitis and crohn's disease. The use of other agents particularly Bifidobacteria, supplementing the regular feed of infants may have an effect as prophylactic agents against acute diarrheal diseases. The effect of probiotic agents appears to be most significant against viral diarrhea (rotavirus) suggests that an immunological mechanism is responsible for the beneficial effects. New research suggests potential applications in vaccine development and prevention of sexually transmitted disease. Probiotic agents are becoming an important part of the armamentarium against gastrointestinal problem in infants and children, as increase in scientific and commercial interest in the use of beneficial microorganisms or probiotics for the prevention and treatment of diseases. Our present study deals with the usage of probiotics in the prevention and treatment of gastrointestinal diseases.

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Antiinflammatory and antioxidant effects of *Aloe vera.*

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ABSTRACT

Aloe vera belongs to the family Liliaceae, a perennial herb having many phytochemical showing pre-clinical therapeutic efficacies for a wide range of human diseases. To date more than 75 active ingredients including aloesin, aloeemodin, acemannan, aloeride, methylchromones, flavonoids, saponin, aminoacd, vitamins, and minerals have been identified from the inner gel of leaves. It has anti-inflammatory, antioxidant, anticancer, antidiabetic, immune boosting and hypoglycemic properties. During the inflammatory process, bradykinin produces pain associated with vasodilation. Aloemodin inactivates bradykinin and produces anti inflammatory effect. *Aloe vera* inhibits histidine decarboxylase and prevents the formation of histamine from aminoacid histidine. Histamine is released in many allergic reactions. Thus the prevention of formation of histamine may explain the antipyretic effect of *Aloe vera*. The soothing and cooling qualities help the pores of the skin to open and receive the moisture and nutrients of the plants to show immediate effect. Oxidative stress in cells and tissues results from the increased generation of reactive oxygen species and decreasing the activity of antioxidant defense potential. *Aloe Vera* decreases pathogenesis of oxidative stress by increasing the activity of antioxidants such as superoxide dismutase, catalase, glutathione peroxidase and glutathione-S-transeferase. The present study deals with the anti inflammatory and antioxidative effects of *Aloe vera*.

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Nano Biology Opens a Promising Way to Shrink Cancer

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ABSTRACT

Biotechnology is the use of living system and organisms to develop or to make useful products for human purpose. Nanotechnology is the natural amalgamation of all fields of science and technology in understanding and manipulating matter on an ever-smaller scale. Typically in developing markets such as nanotechnology, the first application in biotechnology are in diagnosis were scientist use nanotechnology to build arrays to help diagnose multiple disease. Using nanotechnology for "In vivo" uses such as implanting particles in biological tissue to deliver medicine, destroy tumours and stimulate immune responses. Most common is cancer, it is a class of diseases characterised by out-of-control cell growth to form lumps or masses of tissue called tumour. Nanoparticles that deliver two or more drugs simultaneously can significantly shrink cancer and also reduce its spread. A Nano cell is formed by encapsulating a Nano core with a first agent inside a lipid vesicle containing a second agent. The Nano cell is delivered to patients suffering from diseases such as cancer inflammatory diseases (Asthma), autoimmune diseases (rheumatoid arthritis). In treating cancer, a traditional antineoplastic agent is contained in the outer lipid vesicle of the Nano cell, and an antiangiogenic agent is loaded into the Nano core. This arrangement allows the antineoplastic agent to be released first and delivered to the tumour before the tumour's blood supply is cut off by the antiangiogenic agent. The aim of the present study is to outline of the Nano cell in different areas such as diagnosis of multiple disease, drug delivery and stimulates immune responses.

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Phytochemical studies *Phyllanthus niruri in* Hepatitis B virus

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ABSTRACT

Phyllanthus niruri Linn. Belongs to Euphorbiaceae family and is a small herb having wide range of medicinal properties, it is used widely across the world. In Indian Ayurveda system it is used for jaundice, ulcers, skin disease, diabetes, chest pain and urinary complication and even to HIV virus. Its taste is bitter and laxative shows astringent effect. This abstract covers information about ethano medicinal uses of phyllanthus niruri in different countries with various pharmacological profile of the plant. It is used to tone, balance, strengthen, detoxify and protect the kidney. The phytochemical studies were characterized and the presence of various compounds such as lignans, phyllanthus, hypophyllanthin, bioflavanoids (quercetin), glycosinoids, repandusinic acid and tannins were detected. Repandusinic acid has been shown to have anti-viral properties in-vitro The extract of phyllanthus niruri have a wide range of pharmacological activities like antimicrobial, antiviral, hepatoprotective, antioxidant, anticancer ,anti-inflammatory, antiplasmoidal and diuretic . Phyllanthus niruri is very safe at recommended dosage. Hepatitis B is an infectious illness of liver caused by the hepatitis B virus that affects the humans. Hepatitis B is one of the major diseases inflicting the human population. Conventional therapy with interferon-alpha is very expensive and has many serious side effects. Alternative herbal medicine using extract of phyllanthus niruri has been reported to be effective against hepatitis B and other viral infection.The purpose of this study is quantitative determine the antiviral effect of these herb in a well-defined in-vitro system

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Drug Delivery by Nanosponges

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ABSTRACT

Nanotechnology is the creation of functional materials, devices andsystems through control of matter on the nanometer length scale (1-100 nanometers), and exploitation of novel phenomena and properties at that length scale. Nanotechnology is an exciting new area in science, with many possible applications in medicine. They play an important role in different areas such as diagnosis of diseases, drug delivery, imaging, and so on. Nanotechnology in medicine currently being developed involves employing nanoparticles to deliver drugs, heat, light or other substances to specific types of cells (such as cancer cells). Particles are engineered so that they are attracted to diseased cells, which allow direct treatment of those cells. This technique reduces damage to healthy cells in the body and allows for earlier detection of disease. Nanosponges are a new class of materials and made of microscopic particles with few nanometers wide cavities, in which a large variety of substances can be encapsulated. These particles are capable of carrying both lipophilic and hydrophilic substances and of improving the solubility of poorly water soluble molecules. B-Cyclodextrin based Nano sponges are tiny mesh-like structures that may revolutionise the treatment of many diseases and early trials suggest this technology is up to one to five times more effective at delivering drugs for breast cancer than conventional methods. Drugs which are particularly critical for formulation in terms of their solubility can be successfully delivered by loading into the nanosponges.The aim of the present study is to outline the role of nanosponges in drug delivery.

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Aromatherapy by using *Artemisia pallens* for stress induced depression

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ABSTRACT

In developing world, the trend and utility of natural product of medicinal substances is increased in last decade over synthetic medicine, because of toxic effects. WHO currently recommended and encourages traditional herbal remedies in National Health Care programs, because herbal drug easily available at low cost and comparatively safe. Today, approximately 80% of the global population turned to plant derived medicines as their first line of defense from maintaining health and diseases. Davana is botanically known as Artemisia pallens, it is a member of daisy family Asteraceae, Tamil name marikolundu. The essential oil of Davana is extracted from the stem and leaves by steam distillation method. It is widely used in Ayurveda in the treatment of mental disorder, nervous problem, depression, infections, diabetes, and high blood pressure. Aromatherapy is actually a form of herbal medicine. However, instead of using the entire herb, it employs the fragrant "essential oil" [Davana] that is released when a fresh herb is compressed or subjected to chemical extraction. It plays a big part in stress reduction, balanced heart rate and hunger control all because of its inter-relationship with the limbic system. The limbic system [Paleomammalian brain] is the seat of the emotional center and is partly responsible for fight or flight response, hormonal secretions, motivation, pain reflex. The current study reveals the therapeutic traditional use of Davana oil to reduce stress condition and emphasis its mode of actioninvolving aromatherapy method.

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Cosmetic Appications of Red Algae – A Review.

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ABSTRACT

The marine environment is enriched with a variety of organisms that provides a wide range of biologically important compounds that are useful for the cosmetic benefit of humans. This review provides a complete overview of applications of red algae in cosmetics industry. The red algae or Rhodophyta are one of the oldest groups of eukaryotic algae with many therapeutic applications. The red marine algae are useful in General health benefits such as weight-loss programs and for lowering cholesterol and fat in the blood. Algae extracts integrated into cosmetics is recommended to increase cell dynamism and cell regeneration ability. Gigartina is a type of Red Marine Algae (RMA) that has been found effective for Skin, Hair, Nails, and Immunity. Marine red algae of genus Laurencia are becoming the most important resources to produce unique natural metabolites with wide bioactivities. The cosmetic industry uses red algae as a thickening and water-binding agent as well as an antioxidant. It is rich in vitamins and minerals. Red Algae conditions and hydrates the skin while it nourishes, rejuvenates, detoxifies and replenishes minerals and acts as a emollients or antioxidants. Algae can stop or eliminate wrinkling, heal skin, or provide other elaborate benefits. Extracts of red algae are often found as ingredients in face, hand, body creams or lotions, but the use of algae themselves, rather than extracts, is still limited.

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Microbial disease –Due to using asbestos sheet

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ABSTRACT

The aim of the study is the isolation and identification of microbes on asbestos sheet in and around Pondicherry. Samples were processed for fungal isolation using the potato dextrose agar. The conventional methods of swabbing and streaking were used. Pure culture of isolates organisms were identified and characterized using standard microbiological technique. The fungus was isolated asbestos sheet. The avoidance of using these sheets would possible to prevent the microbial disease.

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Prevalence of Microbial contamination of Indian currency notes (Rupee) in circulation – Implications on public health

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ABSTRACT

Many environmental materials serve as vehicles for transmission of bacterial agents to humans. Paper currencies are widely exchanged for goods and services worldwide and can act as vehicles for transmission of potential pathogens. The aim of the study is to determine the prevalence of bacterial contaminants in Indian paper currency notes which are in circulation in puducherry and associated risk factors. Currencies notes were processed for microbial isolation using the Nutrient agar, Macconkey agar, Blood agar and EMB agar. The conventional methods of swabbing and streaking were used. Pure colonies of isolates organisms were identified and characterized using standard microbiological technique. From this study it was concluded that the paper currency is commonly contaminated with microbes and this contamination may be playing a role in the transmission of potentially harmful organisms.

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Ebola Virus

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ABSTRACT

ABSTRACT

Ebola is a rare but deadly virus that causes bleeding inside and outside the body. As the virus spreads through the body, it damages the immune system and organs. Ultimately, it causes levels of blood clotting cells to drop. This leads to severe, uncontrollable bleeding. The disease, also known as Ebolahemorrhagic fever or Ebola virus, kills upto 90% of people who are infe cted and 'there is no vaccinations available as of now, so basic hygiene is of importance and a must be followed in order to prevent the onset of the condition. Simple activities like washing your hands well, drinking water from a clean source, maintaining general hygiene and cooking your meat well, can all serve as precautionary measures.

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Natural Phytochemicals: A Chemopreventive Approach

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ABSTRACT:
Phytochemicals can block initiation or reverse the promotion stage of multistep carcinogenesis. They can also halt or retard the progression of precancerous cells into malignant ones. Cancer is the second leading cause of death, where one in four deaths is due to cancer. According to a recent report by the World Health Organization (WHO), there are now more than 10 million cases of cancer per year worldwide. In 2014, there will be an estimated 1,665,540 new cancer cases diagnosed and 585,720 cancer deaths in the US. Cancer remains the second most common cause of death in the US, accounting for nearly 1 of every 4 deaths. Numerous phytochemicals derived from edible plants have been reported to interfere with a specific stage of the carcinogenic process. Phytochemicals can directly scavenge free radicals and can also generate "chemical or electrophilic stress signals" that trigger proteins related to various cellular signalling pathways. Understanding of these compounds in terms of their chemical and biological functions and beneficial effects on human health is essential. The present study focused on the medicinal plants having promising sources for biologically active compounds having anticancer properties. The phytochemicals have great potential not only for disease prevention, but also for improving the recovery from certain diseases and cancers by regulating various types of cellular damage caused by ROS. The goals of using them as sources of phytochemicals based therapeutic agents and their role in the discovery of leads for the development of conventional drugs for the treatment of cancer.

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Nanomedicine: A Novel Approach

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ABSTRACT:

Nanotechnology is defined as the "intentional design, characterization, production, and applications of materials, structures, devices, and systems by controlling their size and shape in the nanoscale range (1 to 100nm). The Nanomedicine' is defined as the comprehensive monitoring, control, construction, repair, defence and improvement of all human biological systems, working from the molecular level using engineered devices and nanostructures, ultimately to achieve medical benefit. Nanomedicine is the most promising applications of nanotechnology in the field of medicine. Nanomedicine, specifically is the use of nanotechnologies for medical applications. The main advantage of nanomedicine on quality of life and on costs for healthcare is earlier detection of a disease leading to less severe and minimizing the costly therapeutic demands, and an improved clinical result. The present study focused that the applications of nanotechnologies in medicine are especially promising in the areas such as disease diagnosis, drug delivery targeted at specific sites in the body and molecular imaging, are being intensively investigated.

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Comparative analysis of microbial and nutritional qualities of Oyster Mushroom (*Pleurotus florida*) cultivated from Tapioca peel and Paddy straw substrates

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ABSTRACT

Mushrooms are fleshy, spore-bearing reproductive structures of fungi grown on organic substrates. They have played an important role as a human food due to its nutritional and medicinal properties for a long time ago. In present day's mushroom cultivation are regarded as environment-friendly method for recycling of the vast lignocellulosic waste which could otherwise dropped into the environment and cause pollution. Oyster mushrooms (*P. florida.*) are edible fungi belonging to the class *Basidiomycetes* and are increasingly becoming popular as protein-rich delicious vegetable. The present study focus on the comparative analysis of proximate and microbial qualities of oyster mushrooms (*P. florida*) cultivated from the two different substrates -Tapioca peel and paddy straw. The freshly harvested mushrooms from two different substrates were analyzed for moisture, crude protein, crude fat, carbohydrate, crude fiber ash contents and energy values by following the procedure of AOAC, (1990). The total microbial load was enumerated on nutrient agar medium and assessed by colony counting method. The results indicated that oyster mushroom cultivated from tapioca peel substrate was found to be rich in energy (66.98 kcal), crude proteins (4.35%), carbohydrates (7.89), crude fat (1.11%) , ash (1.4%) and crude fibers(0.7%) as compared to paddy straw, it was energy (52.36 kcal), crude proteins (2.48%), carbohydrates (7.33%), crude fat (0.66%) , ash (0.87%) and crude fibers(0.56%). Mushrooms cultivated from paddystraw showed more microbial load than from tapioca peel on storage period.

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The Photodynamic Activity of Ag @ ZrO_2 Core – Shell Nanoparticles in Human Erythrocytes

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ABSTRACT

Core-shell type Ag @ZrO_2 nanoparticles were prepared by one pot simultaneous reduction of $AgNO_3$ and hydrolysis of Zr(IV) isopropoxide. They were characterized by absorption spectroscopy, XRD and HR-TEM techniques. XRD patterns show the presence of ZrO_2 and the noble metal (Ag). High resolution transmission electron microscopic measurements revealed that their size is below 40 nm. Ag@ZrO_2-NPs are showing photodynamic activity in human erythrocytes. The photohemolysis induced by Ag@ZrO_2 core-shell type nanoparticles reveal that the percent hemolysis increased with the increase in concentration and light dose. The study of effect of scavengers, GSH and NaN_3 showed the formation of considerable amount of superoxide anion and singlet oxygen that caused cell death. The detailed mechanism has been discussed. Ag@ZrO_2 nano-photosensitizer being non-toxic, serves as proper substitute for the classical photosensitizers (organic dyes).

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Therapeutic Values of Millets in Cancer Treatment

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ABSTRACT

Millets being rich in antioxidants, minerals and dietary fiber would be effective in combating various diseases. Millets such as Kodo Millet, Foxtail Millet and Proso Millet are excellent sources of carotenoids, flavonoids and phenolic compounds which have excellent antioxidant properties and aid in cancer prevention. Consumption of millet based foods will reduce the risk factors of chronic non communicable diseases and maintain optimum health and nutrition. Therefore regular intake of such millets would greatly decrease cancer risk. Hence linking up the chain through proper identification, procurement, processing and popularizing about millets will promote awareness and increase the consumption rate of millets among the population. This would help to decrease the incidence of cancer.

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Inclusion of Millets in the Daily Diet- A Promotional Approach

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ABSTRACT

Millets are "God's own crops" and poor man's boon. They are rich in calcium, magnesium, phosphorous, iron, antioxidants, dietary fiber and vitamins. Millets also have several health benefits including lowering of blood sugar and cholesterol and decreasing cancer risk. However millet consumption in India is very low, as revealed by national surveys on nutrition (NMB, 2009). Furthermore, increased consumption of polished white rice is significantly associated with risk of chronic diseases such as diabetes and metabolic syndrome (Mohan V, 2009). As millets are nutritionally superior to polished white rice, supplementation of the daily diet with millets would improve the health and nutritional status of the population. This can be achieved by consuming millet based products such as cookies, snacks and sweets. Millets such as foxtail millet, barnyard millet, sorghum etc can be supplemented partially in snacks and cookies. Little millet can substitute rice in the diet. Such value based additions in the daily diet would add variety and improve nutritional status.

Key words: Millets, supplementation, antioxidants.

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Impact of Defatted Soya Flour Supplementation for Malnourished Children

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ABSTRACT

Soya bean – Queen of Pulses. Soya been has highest protein content (40%), fat (20%), Carbohydrates (35%) and minerals (5%). Defatted soya flour is an excellent source of protein (53%). Defatted Soya flour is placing an important role in our present food scenario due to cost effectiveness, convenience to blend and good nutritional quality. Defatted Soya flour has been recommended to substitute pulses up to 50%. This study was carried out to study the impact of substituting Defatted soya flour instead of pulses in "soya bendy" (a mix) preparation by adding wheat flour, green gram flour, groundnut and jaggery. Defatted Soya flour is substituted 50% in 25g of green gram flour to enrich the protein quality of soya bendy. By supplementing soya bendy to malnourished preschool children, there was a significant difference in height, weight and mid arm circumference. To change the current mal nutrition scenario among the preschool children, Defatted soya flour ranks significant position among all pulses.
Key words: Defatted soya flour, enrichment mid arm circumference, soya bendy.

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Phytochemical analysis and Antioxidant Activity of Methanolic Extract from Fruit of *Abelmoschus esculentus*

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ABSTRACT

Many studies supported consuming diet rich in phytochemicals and antioxidants from plants will provide a health -protective benefit. *Abelmoschus esculentus* (okra) is a flowering plant and cultivated through out the tropical and temperate region in the world. Okra is known for its nutritional value and has been acclaimed to have various health benefits. The present investigation deals with qualitative phytochemical analysis for various phytoconstituents and the crude methanolic extract were purified by HPLC to fractionate major antioxidants and characterized by GC-MS. Quantitative estimation of total phenol, total flavonoid content and antioxidant activity of methanolic extract were carried out.Phytochemical analysis revealed the presences of tannins, saponins,terpenoids, flavonoids, anthraquinone, reducing sugar and steroids. The results of HPLC analysis provides peaks determining the presence of antioxidant compounds all of them were confirmed through GC-MS analysis.To our knowledge three major bioactive compounds were identified and quantified which includes quercetin (1.19 mg/g), rutin (0.313 mg/g) and luteolin (0.063mg/g). Total phenol and flavonoids content was estimated to be 21.8±2.0mg gallic acid equivalents/g and3.05±2.0mgquercetinequivalents/g.
The enzymatic antioxidants such as SOD, CAT and GPX and non-enzymatic antioxidants such as ascorbic acid and reduced glutathione activities were measured using standard method.The results showed significant quantity of enzymatic and non enzymatic antioxidants. The present study confirmed that the methanolic extract of *Abelmoschus Esculentus* has strong antioxidant activity and its usage can be encouraged in human nutrition and in disease treatment.

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Antimutagenic Potential of *Allicin* on Sodium Azide Induced Chromosomal Aberrations in *Allium Cepa* Root Tip Cells

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ABSTRACT

Higher plants, an important material for genetic tests to monitor various pollutants present in the environment. Among the plant species, *Alium cepa* has been used to evaluate chromosomal aberrations and disturbances in the mitotic cycle. The present study was conducted to evaluate the mutagenic/ clastogenic potential of Sodium Azide at a concentration of 200µg/ml on *Allium cepa* root meristem cells and to determine the antimutagenic effect of *Allicin* at doses (5µg/ml) (10µg/ml) (20µg/ml), of which the effective dose was found to be 20µg / ml. The *Allium cepa* test is a cytogenetic short term bioassay that has proved to be a useful tool in basic research to evaluate the genotoxic risk of known chemicals. Sodium Azide induces chromosomal breakage, Anaphase Bridge, sticky chromosomes, but when pretreated with *Allicin* the chromosomal aberrations were lesser. Different parameters of *Allium cepa* such as root shape, growth, mitotic index and chromosomal aberrations can be used to estimate the cytotoxicity, genotoxicity and mutagenicity of environmental pollutant. The *Allium* test has many advantages as genotoxicity screening assay, one being that root cells of *Allium cepa* posses the mixed function oxidase system which is capable of activating promutagens or genotoxic chemicals. *Allicin* since being a dietary antioxidant has free radical scavenging activity. *Allium* vegetables including garlic show that these vegetables have important anti-cancer properties. Interestingly, high intake of garlic (roughly translated as daily intake of this food) has been found to lower risk of virtually all cancer types except cancer of the prostate and breast. However, moderate intake of garlic (roughly translated as several times per week) has been reportedly found to lower risks of only two types of cancer colorectal and renal cancer.

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Phytochemical Screening, Antioxidant and antibacterial activity of *Eupatorium triplinerve* Leaf extracts

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ABSTRACT

Most of the people in rural and urban areas of the world are dependent on the medicinal plants for the treatment of infectious disease. In this study, the plant *Eupatorium triplinerve* (in Tamil called '' Ayappan'') collected from Chengalpattu, Chennai was used for the analysis. The aim of this study was to identify the various phytochemical compounds present in *Eupatorium triplinerve* leaf extract and to study its antioxidant and antibacterial activity. The leaf extract of *Eupatorium triplinerve* was prepared using three different solvents such as ethanol, acetone and distilled water. Of the three different leaf extracts studied, only the ethanolic extract of *Eupatorium triplinerve* showed maximum number of phytochemicals such as tannins, saponins, flavonoids, quinones, glycosides, cardiac glycosides, terpenoids, phenols, coumarins, steroids, alkaloids and betacyanin followed by aqueous solvent and of these bioactive compounds, saponins, flavonoids, quinones, phenol and steroids were found to be present in high amounts in ethanolic leaf extract . The presence of coumarin compound in ethanolic leaf extract was confirmed by HPLC analysis. The antioxidant effect of the leaf extract was studied qualitatively by DPPH staining method and quantitatively by BHT (Butylated Hydroxy Toluene) free radical scavenging assay. The ethanolic leaf extract of *Eupatorium triplinerve* showed the maximum antioxidant activity (80.3 %) when compared to that of aqueous (68.8 %) and acetone (65.5 %) extracts. The antibacterial activity was studied by Disc and well diffusion methods. The results showed that the ethanolic leaf extract was effective against the bacterial species studied such as *Bacillus subtilis, Bacillus cereus , Pseudomonas aeruginosa, Staphylococcus aureus ,Eschericia coli*. Thus *Eupatorium triplinerve* is found to be an effective medicinal plant.

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Effects of Cholate Capped Gold Based Curcumin Nanoparticles Administration in Male Spargue- Dawley Rats- A Toxicological Study

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ABSTRACT

Curcumin, Indian solid gold and Indian saffron is a polyphenolic substance extracted from the plant *Curcuma longa* (Linn.). Nano-medicine has been observed limited or no side effects as a result of the injected dose. Hence, Nano based medicine are good modality to treat several diseases including tumour and this preclinical studies may give novel ideas for treating diseases in clinical level. Before going to the treatment one must evaluate the toxicological effect of Nanoparticles. Based upon the OECD guideline toxicological studies were undergone. To evaluate the toxicological effect of Cholate capped Gold based curcumin nanoparticles in Albino rat. Animals were housed in the standard cage with suitable laboratory condition and they were fed with chow pellets and water *ad libidum*. The study was approved by Institutional animal ethical committee (IAEC No. 01/12/13): Animals were divided into one control group (Group I received normal saline) and four experimental group. Experimental groups were based on three dosage (i.e. µl /Kg. body w.t) of Cholate capped Gold based curcumin nanoparticles as follows: 100 (Group II), 200 (Group III), 400 (Group IV) and acute toxicity dose (Group V). Toxicological assessments were made for a period of one month. There was no mortality in any of experimental groups and no change in body weight of the animals. Ulcerogenicity test indicate no gastric lesions. There are no alterations in general behavior of an animal expect grooming/cleaning of face. Biochemical parameters of liver and kidney functions test showed slight changes in enzyme level and test compounds. Histological studies showed mild alterations in the histoarchitechture of both liver and kidney. Overall the toxicological parameters indicate that these are non-toxic to the animals, further studies are required to assess the effective dose.

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