



RESINNOVATIVE 1

ABSTRACT BOOK

National Conference

on

Emerging Trends and Innovations
in Sciences

28 Jan 2020, Tuesday

Organised By



Department of Chemistry
Institute for Excellence in Higher Education (IEHE), Bhopal

In Support With
M. P. Council of Science & Technology
Vigyan Bhawan, Nehru Nagar, Bhopal - 462003

RESEARCH INNOVATION FOUNDATION
T-8 Mahaveer Apartment
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A-109, Near J K Road, Indrapuri
Bhopal, MP, India

*Abstract
Book*

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003



Co-organiser (s):

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THE STUDY OF DYNAMIC MODEL OF TEACHING CHEMISTRY

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GYANODAYA VIDYA MANDIR

ABSTRACT

The dynamic model of teaching is developed. It is an integrated approach with multiple facts of effectiveness. It is multilevel in nature. The present study is the result of the cognitional approach. Total 50 schools, 110 classes and 2500 students participated in this present study. The present study of the dynamic model of teaching chemistry is prepared based on 1) Multilevel 2) based on the relation of elements with achievement that may be curvilinear 3) in relation with effectiveness. Each factor is tested on five elements such as frequency, stage quality and differentiates. The present dynamic model of teaching chemistry is used to test the model of school level by assessing school effectiveness in Chemistry. The result of the study is presented. Implications for the development of a dynamic model for teaching Chemistry are drawn.

Keywords: Chemistry, Dynamic model, Cognitive, and students

A UNIQUE [1+1] HEXAGONAL SCC DERIVED FROM A NITROGEN RICH LIGAND AND ITS DNA INTERACTIONS

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ABSTRACT

A pyrimidine based organic donor clip with pendant pyridyl rings has been designed for its use in the construction of a supramolecular coordination complex (SCC). This molecule is a new addition to the library of "nitrogen ligands" that have been used as building blocks to yield SCCs of various shapes and sizes. Its self-assembly with a suitable complementary metal-based acceptor tecton yielded a unique [1+1] hexagonal macrocycle. This macrocycle was characterized using ^1H NMR, $[31]\text{P}\{^1\text{H}\}$ NMR, ^1H DOSY NMR, ^1H COSY NMR, IR and ESI-MS. PM6 molecular modeling suggested that this [1+1] macrocycle has a distorted hexagonal cavity and is nanoscalar in dimensions. The self-assembled ensembles were found to interact significantly with DNA and they also demonstrate positive nuclease activity with DNA relative to its building blocks.

Keywords: Metallomacrocycle, Self-assembly, DNA interaction, Platinum (II)

ECONOMICS OF BIODIVERSITY AND ECOSYSTEM

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ABSTRACT

Losses in the natural world have direct economic repercussions that are largely underestimated. Making the value of our natural capital visible to economies and society creates an evidence base to pave the way for more targeted and cost-effective solutions. We are facing a biodiversity crisis even though we are major beneficiaries of nature's multiple and complex values. Forests store carbon, provide timber and other valuable products and shelter species and people. Wetlands purify water and offer protection against floods. Mangroves protect coasts and their populations by

reducing the damage caused by storms and tsunamis. Coral reefs provide breeding grounds for fish, leisure and learning for tourists, etc. The list of benefits provided by nature is vast. Yet species are still being lost and nearly two-thirds of ecosystem services have been degraded in just fifty years. We have become only too familiar with the gradual loss of nature and as a result, our natural capital is being run down without us even knowing its real worth. The cost of these losses is felt on the ground but can go unnoticed at the national and international levels because the true value of natural capital is missing from decisions, indicators, accounting systems and prices in the market. Developing our capacity to measure and monitor biodiversity, ecosystems and the provision of services is an essential step towards better management of our natural capital. Providing relevant information in ways accessible to decision-makers will require not only a wider use of valuation but also progress on indicators of biodiversity and ecosystem and on the integration of natural capital into macro-economic indicators.

The present paper highlights the economic value of the ecosystem to explore various benefits derived from them, which are supposed to be direct or indirect and tangible or intangible. It will discuss about various valuation methods that can help reveal the relative importance of different ecosystem services, especially those not traded in conventional markets, in addition to market limitation for the same. Based on case studies and comparing the benefits associated with the conservation of natural areas with the benefits from conversion can provide useful information for setting priorities in a variety of contexts, such as development decisions in urban areas and conservation planning at the national or local scale. It endeavors to suggest measures to get a maximum economic benefit from our natural resources.

Keywords: Natural capital, Biodiversity, Ecosystems, Macro-economic indicators, Valuation methods

UTILISATION AND MANAGEMENT OF WATER IN CONSTRUCTION INDUSTRY OF FOR THE GROWING CITY OF BHOPAL

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ABSTRACT

Over the years land utilization pattern has been changed from forest to agriculture and then to settlements. Increase in population requires more land for non-agricultural use. The agricultural sites are converted into residential locations and locations for other economic activities. Township planning and low-cost affordable housing is developed for the growing population. All these factors resulted into increased pressure on existing civic infrastructure among which water supply is one. Water is used for consumption purpose and also for commercial purposes. Water is one of the important components used in construction work. Un-thoughtful use and wastage of water in the construction operations is alarming as far as the Indian construction industry is concern

In construction work water requirement is very high as water is used at different stages of construction. Hence in the area where there is less availability of water and the water is carried from long distances for construction work cost involved is quite high. Low-quality water can be used but it may reduce the life of building due to weak hydrogen bonding.

The city of Bhopal with a population of about 18 Lakh in 2011, covering approximately 285 sq. km has a high requirement for water. Being the capital city and administrative centre, Bhopal is experiencing development in many respects. As a result demand for water is increasing day by day. In addition to the Kolar dam, many lakes are the main sources of water supply in the city. Growing need of water in construction have posed a problem for the effective and efficient supply of water in the city. Current construction techniques and materials require a large quantity of water which is to be reduced which requires a judicious selection and constant monitoring to save this valuable natural resource. This calls for a well-planned, strategic use of water not only during and after construction but also its conservation and management.

The present paper is an attempt to analyse the availability of water and its use in the construction industry in the city of Bhopal. It also tries to analyse monetary aspect of strategies used in construction with reference to water management.

Keywords: Construction, Effective supply, Judicious use, Strategic, Settlement

COST-BENEFIT ANALYSIS OF VEGETABLE PROCESSING THROUGH DRYING METHOD

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ABSTRACT

Changing life style and increasing awareness among the consumers has created the demand for year round availability of different vegetables, which are basically the perishable items. The concept of processed food items has caught the imagination of consumers in recent years because of their enhanced convenience, variety, nutrition and taste. Vegetables are the impotent part of balanced diet requirement of individuals which demand variety with nutrition and taste. Meeting such a demand requires a continuous development of new processes that will maximize its appeal and shelf-life, and minimize the use of chemicals and preservatives.

There are different methods which can help in enhancing and prolonging the edible life and keeping intake the nutritional values of vegetables. One of such method is Drying using alternative ways. The method of drying the vegetables, to be used at later point of time, can be used at household and at commercial level. India's share in world vegetable production is 14.4% out of which 25% is wasted because of lack of proper processing techniques and because of absence of social culture. Using scientific way to preserve this perishable item can help the household by way of affordable availability of vegetable in off season as well as provide a small scale business opportunity.

The present work is related to the study of cost effectiveness of these methods in the light of money cost time cost, efforts and above all intact nutritional values of the vegetables. The study was conducted with green vegetables. The processing method used were Sun drying, Shed drying, Oven drying, and microwave drying. The comparative study covered nutritional value at different temperature and seasons in terms of vitamin mineral contents. The Microwave drying technique was identified as the most effective technique among all.

Keywords: Cost effectiveness, Drying, Nutritional value, Mineral contents, Commercial

HYDROTROPY AND MIXED HYDROTROPY CONCEPT (SOLUBILITY ENHANCEMENT TECHNIQUE): A REVIEW

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ABSTRACT

The solubility, property of the drugs becomes one of the most challenging aspects in formulation development. Poor solubility is one of the most difficult problems of maximum drugs. There are many techniques which are used to enhance the aqueous solubility. Solubility enhancement of various poorly soluble drugs is a challenging task for researchers and pharmaceutical scientists. Hydrotrophy is one of the solubility enhancement techniques which enhance solubility to many folds with use of hydrotropes like sodium benzoate, sodium citrate, urea, niacinamide etc. and have many advantages like, it does not require chemical modification of hydrophobic drugs, use of organic solvents. Mixed hydrotropic solubilization technique is the phenomenon to increase the solubility of poorly water-soluble drugs in the blends of hydrotropic agents, which may give miraculous synergistic enhancement effect on solubility of poorly water soluble drugs. The present review summerizes the investigations carried out for use of various hydrotropes for various drugs. Most of the investigations concluded that hydrotrophy and mixed hydrotrophy was most efficient tool for solubility enhancement.

Keywords: Hydrotrophy, Mixed hydrotrophy, Hydrotropes, Solubility enhancement

SPECTROPHOTOMETRIC ESTIMATION OF POORLY WATER SOLUBLE DRUG (NIMESULIDE) USING MIXED HYDROTROPIC SOLUBILIZATION CONCEPT

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ABSTRACT

Poor solubility is one of the most difficult problem of maximum drugs. Mixed hydrotrophy is one of the advanced method, in which aqueous solubility of poorly water soluble drugs is increased by adding other highly water soluble substances. Such agents used to increase the solubility of poorly water soluble drug in aqueous medium are known as hydrotropic agent or hydrotropes like Sodium Benzoate, Niacinamide, Sodium Citrate, Sodium Acetate and Urea. Mixed hydrotropic solubilization technique is to increase the solubility of poorly water-soluble drugs in the blends of hydrotropic agents.

The solubility of large number of poorly water soluble drugs has been enhanced by mixed hydrotrophy concept. The present study was aimed at enhancement of nimesulide solubility using mixed hydrotrophy concept. The present research work also provides an ecofriendly method to estimate spectrophotometrically, the Nimesulide drug in tablet formulations without the help of organic solvent. Mixed hydrotropic tends to decrease the concentration of individual solubilizers and toxicity.

Organic solvents are most frequently employed in spectrophotometric analyses. They may be sources of pollution. Some of them may be toxic while others may be costlier. In the present investigation, it was proposed to solubilize Nimesulide by use of mixed hydrotrophy concept. Nimesulide shows maximum absorbance in the concentration range of 10-40 μ g/ml at 390 nm. Method of analyses have been validated for different parameters like linearity, accuracy and precision. The percent drug estimated in tablet formulation of tablet-I and of tablet-II were 102.61 \pm 0.669 and 102.10 \pm 0.461 respectively. The range of percent recoveries varied from 102.24 \pm 0.508 to 102.83 \pm 0.442. Sodium citrate and phenol do not interfere above 300 nm. The analytical method was found to be simple, free from toxicity, economic and eco-friendly.

Keywords: Nimesulide, UV-Spectrophotometry, Mixed hydrotrophy concept

FORMULATION DEVELOPMENT AND EVALUATION OF DISPERSIBLE TABLETS OF ETHIONAMIDE

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ABSTRACT

The objective of the present study was to formulate a suitable dosage form for pediatrics so as to avoid the inconvenience of swallowing. The purpose of the present study was to develop a dispersible oral dosage form for an Ethionamide. Dispersible tablets are film coated or uncoated tablets intended to be dispersed in water before administration, giving a homogeneous dispersion or suitable suspension. In the present study, various binders like Acacia, Low substituted Hydroxy propyl cellulose LH 11, Poly vinyl pyrrolidone K 30, Maize starch; Crospovidone as Super disintegrant; Sucralose and Aspartame as sweeteners; Menthol, Peppermint as a flavors, Magnesium stearate as a glidant and lubricant respectively were used for the preparation of dispersible tablets. Here, seven trials were performed by using above mentioned inactive ingredients and drug through wet granulation method and evaluated for various pre-compression and post-compression parameters. It was observed that the Trial F6 had sufficient hardness and disintegration time. The trial F6 was tested for *in vitro* drug release pattern in 0.1 N HCl. Studies were carried out for F6 formulation and results were showed no change in the drug release before and after studies.

Keywords: Dispersible tablets, Hardness, Disintegration time, *In vitro* drug release studies

EFFECTS OF SOME CHEMICALS ON HUMAN HEALTH

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ABSTRACT

Organic compounds which induce cancer, affect DNA and cell growth are known as carcinogens. In presence of sunlight, different unburnt hydrocarbons (released as combustion products of automobiles) react with oxides of nitrogen to form Peroxyacetyl nitrates [PAN] and other complex products. Some of these photochemical oxidation products have bad effects on the respiratory system and the asthetic performance of Humans. They cause irritation of eyes, nose, throat increased chances of asthmatic attack and mortality. They destroy vegetation and rubber products.

High concentration of (5000-10000 ppm) of hydrocarbons effects lungs and causes swelling when they enter the lungs. Inhalation of aromatic hydrocarbon vapours cause greater ill effects like irritation to mucus membrane, respiratory problems, lungs cancer, affect nervous system and may even lead to death. The effects of some carcinogens on human beings are given as:

Carcinogen

Benzene (20,000 ppm)

Benzidine

Bis-chloromethylether

Vinyl chloride

Ethylenedichloride

β -naphthylamine

Hazards

Lungs cancer, death

Bladder cancer

Lungs cancer

Liver cancer

Stomach, Spleen and Liver cancer

Urinary Bladder cancer

Keywords: Hydrocarbons, Peroxyacetyl nitrates, Carcinogens

ADVANCED BAMBOO STEM DERIVED MICROCELLULOSIC FIBRE BASED POLYMERIC COMPOSITES

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ABSTRACT

The rising concern due to the depletion of fossil-based, non-renewable resources have led towards increasing interests for the use of sustainable and renewable feedstock. Over the decades, CSIR-AMPRI have been successfully involved in Scientific and Technological interventions in R and D works related to Natural Fiber-based advanced Polymeric Composites and has established excellent proven expertise in the area of advanced material development, its processing and characterization along with its specific applications.

Further, Bamboo is a naturally available renewable and versatile resource which can be zestfully utilized for making advanced polymeric composites. In this work, chopped bamboo fibres have been chemically processed to obtain microcellulosic fibres which were then, thoroughly treated with appropriate polymeric matrix in a definite ration, reaction conditions and process parameters for the development of advanced Microcellulosic-Polymeric Composite.

The developed polymeric composite has been successfully characterized using various sophisticated techniques like XRD, FTIR and EDX to evaluate its various properties. The formation of fine threads of microcellulose has been confirmed using SEM microphotographs. The thermal insulating property of the developed composite material have been also studied and reported.

Thus, this study shows the potentiality of the developed advanced Microcellulosic-Polymeric Composite for a broad spectrum of applications in various sectors like energy, construction, etc.

Keywords: Polymer Composites, Bamboo, Microcellulosic Polymeric Composite

AN ANALYSIS OF IMPACT OF 7E MODEL OF ELECTROCHEMISTRY ON STUDENTS ACHIEVEMENT

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ABSTRACT

The objective of the present study is to build activity based 7E Model for electrochemistry and to investigate effect of 7E constructive approach on students' performance. The quasi-experiment design was employed to personal study. Total 55 students from Senior Secondary School participated in the study. The research question and one hypothesis are formulated to guide the study. The Chemistry Achievement Test (CAT) tool is used to collect data. A reliability coefficient of equivalence 0.88 and coefficient stability 0.84 is obtained by using Pearson Product Moment Correlation. Result of the study reveals that student taught by using 7E Model of electrochemistry has higher mean score as compared to students exposed to traditional chalk and talk method. Hence it is recommended that teacher should construct instructional model in teaching Chemistry. Students should also be involved in active process of learning such as minds-on, hands-on and discoveries so that students can discover and generate knowledge themselves and will become independent problem solvers.

Keywords: Chemistry, Model, Effectiveness, Students and Understanding

ADVANCED NON-TOXIC X-RAY RADIATION SHIELDING MATERIAL USING TAILORED BRINE SLUDGE

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ABSTRACT

The utilization of all the different types of radiations is very important aspect of our lives, but there improper use leads to severe harmful effects too. To avoid these harmful effects appropriate radiations shielding material are used. The Conventional radiation shielding materials are either based on single phased material like toxic lead or costly barium based compounds and any matrix made from these materials have only single phased compounds, thereby posing limited radiation shielding characteristics. CSIR-AMPRI, Bhopal has been involved in the development of advanced non-toxic, cost-effective radiation shielding materials using various resource materials like industrial waste, agriculture waste etc. Brine sludge, a chloral alkali industry waste contains multiple compounds like barium sulphate, calcium carbonate, magnesium hydroxide, sodium chloride etc. and thus can be successfully converted of multi-phase based radiation shielding materials.

A novel process is developed for making advanced non-toxic radiation shielding material utilizing tailored brine sludge. The developed shielding material was characterized using sophisticated instrumental techniques. The material was further used for studying the x-ray attenuation test using x-rays of energy 60kVp qualitatively. The process enables to convert a toxic waste material into highly value added advanced non-toxic radiation shielding materials which possess homogeneous radiation shielding matrix and will be useful in strategic sectors like health care; hospitals in X-rays, CT scanner rooms etc.

Keywords: Brine Sludge, Radiation shielding, X-ray

QSAR STUDY OF SULPHONAMIDE AND SULFAMATE DERIVATIVES AS POTENT CARBONIC ANHYDRASE INHIBITORS

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ABSTRACT

A quantitative structure-activity relationship (QSAR) study has been made on a series of sulphonamide and sulfamate derivatives as potent inhibitors of carbonic anhydrase. Several types of descriptors, including Informational, CPSA descriptors and connectivity indices were used to derive a quantitative relationship between activity and structural properties. A multiple linear regression analysis shows that six parametric models found to be best for modeling $pK_i(hCAI)$ activity of the present set of compounds. For the best QSAR model the statistics were $R^2=0.8078$; $Q=0.9511$; $N=47$ for the present set of compounds. This model was further validated using the leave-one-out (LOO) cross-validation approach and Ridge regression analysis.

Keywords: QSAR, CPSA descriptors, (LOO) cross-validation, Ridge regression analysis, Model

PAPTODE A SMART ANALYTICAL TOOLS FOR DETERMINATION AND REMOVAL OF ATMOSPHERIC SO₂: GREENER APPROACH TOWARDS CLEAN AND GREEN ENVIRONMENT

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ABSTRACT

Air pollution is the most devastating. Among The major types of air pollutants SO₂, one of the most important air pollutants is emitted into the atmosphere in large quantity. SO₂ Semicarbazide hydrochloride is proposed as an efficient absorbing reagent for the fixation of atmospheric sulphur dioxide. The proposed reagent is non-toxic and is readily available in pure form. The pink dye has a maximum absorption at 505 nm. After absorption on paper paptode changes its RGB value is determined digital software MATLAB, using p-aminobenzene and formaldehyde in acidic medium. The proposed method may be successfully applied to the determination of sulphur dioxide in environmental samples.

Keywords: Air pollutant, MATLAB, Paptode, Immobilizing

DEVELOPMENT OF A SMART TOOL FOR ACETONE IN AIR ON PAPER PLATFORM: A GREEN CHEMICAL APPROACH

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ABSTRACT

Air pollution reaches levels of serious concern and it has now attract the attention of the world. It is a mixture of solid particles and gases in the air. Organic and inorganic compounds are now a day a major part of air pollution. Aldehydes and ketone including formaldehyde, acetaldehyde, and acrolein and acetone are toxic organic components of air pollution that cause lung cancer and cardiovascular disease with chronic exposure.

A sensitive method is proposed for the determination of Acetone in air. Acetone reacts with vanilin in alkaline medium forming a yellow-orange dye with an absorption maximum at 430 nm. Beer's law, Molar absorptivity and Sandell's sensitivity are to be studied. The important parameters for complete colour development are to be optimized on the paper platform and analyzed on MATLAB software using RGB analysis for the determination of Acetone in air samples.

Keywords: Acetone determination, Air sample, Green chemistry

PHYTOREMEDIATION OF CADMIUM CONTAMINATION THROUGH ARTIFICIALLY CONSTRUCTED SOIL, PLANTS, WATER SYSTEM

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ABSTRACT

Phytoremediation is an eco-friendly approach to clean up the environment. The remediation process in phytoremediation relies on the natural processes of plants and microorganisms to clean different types of hazards present in water, soil, and sediments. Phytoremediation is a bioremediation process that uses various types of plants to remove, transfer, stabilize, and/or destroy contaminants in the soil and groundwater. In this process, the plant releases natural substances through its roots, supplying nutrients to microorganisms in the soil. It refers to the natural ability of certain plants called hyper accumulators to bioaccumulate, degrade, or render harmless contaminants in soil, water, or air. Toxic heavy metals and organic pollutants are the major targets for phytoremediation. Innate sites is an innovative and cost-effective option to address recalcitrance phytoremediation, the use of green plants to clean up polluted soil and water resources has received much attention in the last few years. Phytoremediation offers owners and managers of metal contemn environmental contaminants. Uptake of Cadmium by Soil, Plant and Water system Results indicated that the cadmium uptake between inlet and outlet by artificial constructed soil, water, plant system observation it was found to significantly at 10% level in 30-60 d old treated *Brassica compestris* (Indian mustard) plants as increasing Cadmium in make by 0-50-100-200-400 ppm. Concentration series of CdCl₂ and Cd(NO₃)₂ solutions and treated.

Keywords: Eco-friendly, Phytoremediation, Hyper accumulators, Indian mustard

DETECTION OF OUTLIER IN QSAR MODELING OF THE BIOLOGICAL POTENTIAL OF HEPT ANALOGUES

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ABSTRACT

Quantitative structure-activity relationships models are theoretical models that can be used to predict the physicochemical and biological properties of molecules. The critical step of building a high-performance QSAR model is the detection of outliers in the model. Compounds which have unexpected biological activity and are unable to fit in a QSAR model are known as outliers. These are valuable in defining the limitations under which compounds act by a common molecular mechanism modeled by one or more descriptors, and also in defining the experimental limitations of the biological test data. Thus, it is important that the outliers should be submitted to particular attention. Hence detection and Separation of these outliers from the main data set and formulating another QSAR can resolve the problem. The paper describes the choice of statistical method as well as the descriptors used in identifying the outlier molecule yielding a better QSAR model.

Keywords: Outlier, QSAR, NCSS, PRECLAV, HEPT

PHYSICO-CHEMICAL AND SURFACE CHARACTERISATION OF BIOCHAR PRODUCED FROM SUBABUL AT DIFFERENT PYROLYSIS TEMPERATURE

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ABSTRACT

The production of biochar through pyrolysis of biomass sources has the potential to improve nutrient retention in soil, increasing Carbon storage and decreasing Green House Gas emissions. This study revealed that how physical, chemical and surface characteristics of biochar changes with pyrolytic temperature. Biochar produced from subabul stalk at different pyrolytic temperatures (300, 350, 400, 450 and 500 °C) with particle size of 0.7-1.4 mm and the heating rate of 14 °C min⁻¹. The produced biochars were characterized by pH, EC and proximate analysis. Total elemental C, H, N, O, and S content, calorific value and total inorganic elemental composition were measured. The surface functionality of the biochars was measured by FTIR spectroscopy. The findings indicate that both chemical and surface properties of biochars were significantly affected by the pyrolysis temperature. As pyrolysis temperature increased the aromaticity, carbon content, and ash content increased while the oxygen and hydrogen contents decreased.

Keywords: Biochar, Pyrolysis, Surface properties, Characterization

QUANTITATIVE ESTIMATION OF HEPT DERIVATIVES AS ANTI-HIV AGENTS USING AUTO CORRELATION PARAMETERS

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ABSTRACT

A quantitative structure-activity relationships (QSAR) study using Multiple Linear Regression (MLR) methodology was performed for a series of 79 HEPT derivatives, a potent inhibitor of the human immunodeficiency virus. Various QSAR models have been developed to predict the activities in terms of log (1/EC₅₀) using Dragon descriptors. The present study was aimed at developing a predictive and robust QSAR model for predicting anti-HIV activity of HEPT derivatives for understanding of the molecular features of these compounds which are important for their biological activity. Using the MLR model, some new compounds have also been proposed which show higher potency.

Keywords: QSAR, immunodeficiency virus, biological activity, MLR model.

THE MICROBIOLOGICAL PROGRESSION AND PECULIARITIES OF PROBIOTICS COMBATIVE/MILITANT TO LACTOBACILLI SPECIES SEEDING/ROOTING BACTERIAL VAGINOSIS

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ABSTRACT

The advance clinical manifestation of microbial infections in women includes diagnosis and treatment of many lower reproductive tract infections especially in developing countries where there is a serious need for development. Bacterial Vaginosis which is termed as a serious microbiological disease has the attributes of the shift in the normal flora from the

dominant species to a poly-microbial flora. The causative factor of the disease is the largest known genus *Lactobacillus* which consists of about 50 different discovered species. The microbiological action towards the disease includes variables like Bacteriocin and Probiotics. The development of the strain includes the involvement of the techniques like RAPD for the identification and classification of the desired strain for the treatment. The media used for the studies include MRS Broth and agar, TGYE media for the plating. This indicates positive results in the medical technology and proves to be a promising treatment for the reproductive tract infections caused in the human population.

Keywords: Bacterial Vaginosis, Probiotics, Bacteriocin, *Lactobacillus*, Reproductive tract infection

TO PROMOTE THE GROWTH OF PULSES IN DRY REGIONS BY USING MICROORGANISMS

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ABSTRACT

In every region of the world, it is necessary to find or develop proper techniques for agriculture. It is very necessary to meet the demands of food for the increasing population. Sustainable agriculture is one of the ways to meet the increasing need. We can improve local agriculture in arid zones by using sustainable agriculture. Pulses can utilize limited soil moisture and nutrients than cereal crops. They provide vitamins, minerals, proteins, fibres and can withstand adverse conditions up to a level. For this reason, they can be grown in the arid region. Although, pulses need less amount of water and nutrients to grow other things like abiotic stresses and deficiency of nutrients in rhizosphere can hinder the growth of pulses in the arid region. So, inoculating them with PGPR microbes can enhance their growth. PGPR can be very effective and are potential microbes for enriching the soil fertility and boost the agriculture yield. They help to replace chemical fertilizer for sustainable agriculture production by producing growth-promoting substances. Among the PGPR group azotobacter are omnipresent, free-living, aerobic bacteria. The possibility of using *A. chroococcum* in research as inoculants on the pulse has strikingly enhanced the growth of pulse in arid or semi-arid region soil. They are free-living, nitrogen fixer azotobacteria genus that can synthesizes auxin, cytokinins, gibberellic acid-like substances and these growth materials are the primary metabolites that regulate and enhance the growth of crops. It stimulates rhizospheric microbes, protects the plants from phytopathogens, improves nutrient uptake and ultimately boosts up biological nitrogen fixation. Thus, they helped the pulse to grow effortlessly in the arid region by providing the necessary nutrients and protecting pulse crops from abiotic stresses.

Keywords: Growth of pulses, Microorganisms

ANALYSIS OF BACTERIOCINS ACTIVITY FROM LACTIC ACID BACTERIA IN FOOD AND DAIRY PRODUCTS BY DIFFERENT MOLECULAR TECHNIQUES

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ABSTRACT

Bacteriocins is found in the food that is transposed during food souring (in situ), bacteriocins by LAB can be considered in excessive proportion during *in vitro* fermentations under finest physical and chemical atmosphere. Many functions have been intended to the detection, purification and characterization of bacteriocins, besides we can apply a food preservation scheme. Bacteriocins are a contrasting type of ribosomally integrated, extracellularly released, bioactive peptides or proteins showing antimicrobial action versus further bacteria. Its reactivity enhances amylolytic enzymes and lipase proposed like a lipid and carbohydrate element could be essential for the activity. The amino acid content of the filtered bacteriocin was evaluated to 29 amino acids. The bacteriocin was appeared by a distinct technique like SDS-PAGE and amino acid contents. The report of analysis is conducting with the utilization of bacteriocins to the preservation of food products obtained from animal source is too convenient in compositions, but its drought for an

abstract on the exploitation of bacteriocins in vegetable meals. The promoter strain was recognizing by molecular typing to be held by the species *Lactobacillus delbrueckii*, which is an isolated maker of bacteriocins. The preventor factor was boiling coherent and vital against LAB (lactic acid bacteria) classification and various food-borne diseases: *Escherichia coli* and *Yersinia enterocolitica*.

Keywords: Bacteriocins, Soured food, In situ production, Lactic acid bacteria, Dairy industry

PAPER BASED SENSOR: A POTENTIAL DIAGNOSTIC DEVICE FOR DETERMINATION OF LEAD

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ABSTRACT

Environmental pollution and its consequences are of global concern. There is an urgent need of the development of simple, low-cost detection or diagnostic point of care devices to detect, analyze and determine the pollutants in various environmental, food and biological samples. Such development will be critically important for the the improvisation of human health and quality of life. Toxic heavy metals potential contaminates and has lethal effects on the deterioration of the environment and thereby on human health. Paper based analytical sensors are an efficient diagnostic point-of-care devices being cheap, robust, user friendly and environmental friendly. We proposed a paper based sensor for detection and quantitative determination of Lead (Pb) by immobilization of potassium Iodide and Ninhydrin over paper platform. A bright yellow colour of varying intensity develops on coming in contact with samples contaminated with lead. The coloured area was then scanned and images were transferred to image processing (IP) tool of MATLAB software to read their RGB values. The effective intensities were then calculated mathematically.

The developed sensor determines the contamination of lead below 0.05 ppm.

Thus, the proposed paper based analytical sensor is potential diagnostic point-of-care device.

Keywords: MATLAB, RGB, TLV, Paper based sensor

SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL STUDIES OF VO (II) AND La (II) COMPLEXES OF CHEMOTHERAPEUTIC IMPORTANCE DERIVED FROM BIDENTATE LIGANDS

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ABSTRACT

Metal complexes of VO(II) and La(II) Schiff bases derived from 5-acetamido-1,3,4-thiadiazole-2-sulphonamide (Acetazolamide) and 4-chloro-5-sulfamoyl-2',6'-salicyloxylidide (Xipamide) with Salicylaldehyde have been prepared and characterized on the basis of their physical characteristics, particle size analysis, UV, IR spectral studies. The spectral data confirmed the coordination of Schiff base with metal through imine nitrogen and an oxygen atom. Studies confirms the bidentate nature of ligands. The conductivity data of the complexes suggests their non-electrolytic nature. Biological screening effect of Schiff base ligands and their complexes have been studied against gram-positive and gram-negative bacteria by using the disc diffusion method. Enhanced antibacterial activity of Schiff bases and their metal complex as compared to parent drug suggests that the complexation process can enhance the physiological activity.

Keywords: Schiff base, Conductivity, Non-electrolytic, Acetazolamide, Xipamide, Disc diffusion method

DETECTION AND CHARACTERIZATION OF FUNGAL DISEASES ON TREE SPECIES IN FOREST NURSERIES

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ABSTRACT

The department of Forest, Govt. of Madhya Pradesh maintained Eight to ten forest nurseries in Indore District. These Nurseries develops and supply seedlings of about 30 species of trees for various purpose. During the routine survey of nurseries, after rainy season seedlings of eight tree species were found to be infected by fungal pathogens leading to leaf spot disease. Some of the important pathogens include species of fungi belong to the genera *Uredo*, *Pestalotiopsis*, *Sphaceloma*, *Alternaria*, *Septoria* and *Oidium*. The fungal disease incidences in seedlings were described.

Keywords: Forest nursery, Fungal pathogen, Leaf spot disease

STUDY OF SPECIALIZATION LEARNING MODEL ON STUDENTS ACHIEVEMENT IN COMMERCE AND THE PERSONALITY-CONCEPT

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ABSTRACT

Education can be described as the transmission of the values and accumulated knowledge of a society. Children are bom without any culture. Education is designed to guide them in learning a culture, moulding their behaviour towards adulthood, and making them understand their role in society. In the most primitive times, there was little formal learning. Schools with an improved level of education and achievements, preserving the cherished values and expectations of the people, are the need of the day and this fact is now accepted worldwide. These are indeed necessary for entering the twenty-first century with a high degree of optimism and a determined resolve to march forward on the path of progress. The Present work deals with deals the comparing the mean scores, on the criterion achievement test in Commerce, of the three groups of students, to be taught Commerce with the use of Inductive Thinking Model(ITM), (SLM), Conventional Method(CM) of teaching, before the experimental treatment. On the criterion achievement test in Commerce, of the three groups of students, to be taught Commerce with the use of ITM, SLM and Conventional Method of teaching, after the experimental treatment.

Keywords: Knowledge, Commerce, Thinking Model and Conventional Method

THE INTRAMOLECULAR INTER-LIGAND H-BONDING INTERACTION AND CONFIRMATION OF IDA MOIETY CONTROLLING THE FORMATION OF THE M(II)-N9(H-N7)HYPOXANTHINE OR M(II)-N3(H-N9)HYPOXANTHINE COORDINATION BOND: CRYSTAL AND MOLECULAR STRUCTURE

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ABSTRACT

The molecular and crystal structure of various metal chelates and ternary compounds with or without hypoxanthine of the type M(II)(N-R-(iminodiacetate-like)(hypoxanthine) hereafter IDA-like and hyp [M = Cu, Co, Ni, Zn], where R = H, methyl, benzyl, *p*-F-benzyl, *p*-Cl-benzyl, *p*-methoxy-benzyl, phenethyl, *p*-xylylene. Moreover, four molecular compounds of the type [M(II)(pdc)(hyp)(H₂O)] and [M(II)(pdc)(hyp)(H₂O)₂] where M(II) = Cu and Co, Ni, Zn

respectively have been synthesized. They feature M(II)-N9(H-N7)hyp coordination bond owing to the planarity of pyridine dicarboxylic acid ligand. The coordination polyhedron for copper is distorted tetragonal (4+1) type while for the rest of the metals; it is distorted octahedral of the type (4+2). The molecular structure of the ternary compounds reveals that the bonding pattern of hypoxanthine is largely affected by the *fac*-NO₂ or *mer*-NO₂ conformation of iminodiacetate (2-) fragment of (N-R-IDA) ligands. The M(II)-N9(H(N7)hyp) coordination bond (4+1) formed with copper(II) and M(II)-N3(H(N9)hyp) [M(II) = Co, Ni, Zn] exists with the help of intramolecular inter-ligand N9-H(hyp)···O(IDA-like) interaction. The study of molecular recognition pattern of a series of hypoxanthine metal complexes also reported herein which reveals that the basicity of nitrogens of oxopurine exhibit N9>N7>N3 order.

Keywords: Iminodiacetate (2-), Hypoxanthine, Metal(II)chelates, Crystal structure, Molecular recognitions, Inter-ligand interaction

COMPARISON OF ANTIOXIDANT ACTIVITY OF NATURAL AND SYNTHETIC ZEOLITES

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ABSTRACT

Zeolites are porous minerals with high absorbency and ion-exchange capacity. Their molecular structure is a dense network of AlO₄ and SiO₄ that generates cavities where water and other polar molecules or ions are inserted/exchanged. Even though there are several synthetic or natural occurring species of zeolites, Unique and outstanding physical and chemical properties of zeolite materials make them extremely useful in a variety of applications including agronomy, ecology, manufacturing and industrial processes. Recently, a more specific application of one naturally occurring zeolite material, clinoptilolite, has been widely studied in veterinary and human medicine. Clinoptilolite is an excellent detoxifying, antioxidant and anti-inflammatory agent. The objective of the present study was to evaluate the antioxidant activities of natural and synthetic zeolites. The *In vitro* antioxidant activity of zeolites was assessed against hydrogen peroxide (H₂O₂) DPPH, 1,1-diphenyl-2-picryl-hydrazyl free radical (DPPH) scavenging using standard protocols. Synthetic zeolites showed higher antioxidant activity than naturalzeolite. It can be concluded that the antioxidant role attributed to zeolites is based on the ability to reduce lipid peroxidation, free radicals levels and also to increase total antioxidant status (TAS) in serum.

Keywords: Zeolites, Clinoptilolite, Antioxidant activities, H₂O₂, DPPH scavenging model

SPECIATION STUDIES OF LEAD, CADMIUM, MERCURY IN BIOLOGICAL SYSTEM

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ABSTRACT

Heavy metals, Pb, Cd, Hg defined among toxic metals ions. The ligands used in the present study are very good chelating agent and their contribution to heavy metals bioavailability and remobilization processes in human health and environment is a major concern. In recent years, their multiple industrial, domestic, agricultural, medical, and technological applications have led to their wide distribution in the environment, raising concerns over their potential effects on health/environment. The geometry, thermodynamic stability, speciation studies, and intrinsic reactivity/lability are properties of complex which can have a major influence on metal-target binding and on the elucidating of toxicity. Interaction of bivalent toxic metal ions with N, O donar ligands has been investigated in solution. The use of SCOGS computer program has furthered our understanding to obtain the speciation of various species formed in a particular equilibrium. The species distribution curve and plausible equilibria suggests that the formation of protonated and nonprotonated species occurs either in a stepwise manner or simultaneously. Possible solution structures of the complex species are also inferred. The stability of complexes w. r. t. metal follows the trend Cd^{II}<Pb^{II}<Hg^{II}. The ternary complexes is found to make more stable complexes as compared to binary, confirmed by positive $\Delta \log K$ values. ΔG , ΔH° and ΔS° of complexes were also calculated. Statistical operations along with χ^2 ,

skewness and kurtosis were applied to their best fit. Trend of stability order w. r. t. ligand is Amino acids>Dicarboxylic acids>Catechols.

Keywords: Speciation, SCOGS, Biological system

PT(II)-BASED MACROCYCLES AND ORGANOMETALLIC COMPLEXES, THEIR BIOLOGICAL INTERACTIONS WITH DNA OR CANCER CELLS

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ABSTRACT

In contemporary research, coordination-driven self-assembly has evolved as an efficient synthetic strategy to yield discrete and complex supramolecular frameworks (metal cycles and metallacages) of various shapes and sizes having exciting aesthetic appeal.^[1a] In addition, these metal-based self-assembled species have demonstrated potential applications as catalysts, sensors, molecular reactors, etc.^[1b] More recently, there is a growing interest in studying biological applications of these discrete self-assembled metallacages and metallacycles [*aka* supramolecular coordination complexes (SCCs)].^[1c] The interactions between SCCs and biological entities (cancer cells, DNA or proteins) has been review by Chi and coworkers.^[1c] It was suggested that innumerable possibilities exist with regard to the biological applications of SCCs, considering their facile synthesis and “limitless modularity and tenability”.

Motivated by these reports and considering the immense potential biological applications of supramolecular architectures as therapeutic drugs, our work is focused on the development of new multitopic ligands containing N-heterocycle (donor) and Pt(II) based organometallic compound (acceptor).^[2a] Using these donor and acceptor tectons as building blocks, we have self-assembled unique nano-dimensional metallomacrocycle. Subsequently, we have explored their interactions with DNA. Our results suggest that ionic macrocycles have a better interaction with DNA^[2b]. Other studies shows that Pt(II) based organometallic complexes are effective towards cancer cell growth inhibition.

Keywords: Supramolecular, Macrocycles, Organometallic, Heterocyclic, DNA, Cytotoxicity

ELECTROCHEMICAL SENSOR FOR THE QUANTIFICATION OF CAPSAICIN USING CHEMICALLY MODIFIED VOLTAMMETRIC SENSOR SECTION-ANALYTICAL AND ENVIRONMENTAL CHEMISTRY

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ABSTRACT

Capsaicin (8-methyl-N-vanillyl-6-nonenamide) primary pungent and irritating component present in chilies and red pepper is a polyphenolic compound with large spectrum of medical applications. A simple, ultrasensitive and convenient electrochemical method has been developed for quantification of antioxidant Capsaicin, at carbon measoporous modified glassy carbon electrode (CMP/GCE). The electrochemical behavior of capsaicin at the sensor was studied using square wave voltammetry as a function of the concentration of capsaicin. The voltammetric studies of capsaicin at CMP/GCE exhibited a well-defined cathodic peak for its reduction in optimized buffer solution at fixed pH. Under optimized experimental conditions, the square wave reduction peak current was linear over a wide concentration range. A very low limit of detection was obtained for the fabricated sensor. The results indicate that the modified electrode possess excellent sensitivity towards reduction of capsaicin.

Keywords: Capsaicin, Polyphenols, Voltammetry, Square wave voltammetry

AN OVERVIEW ON TOXICANTS

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ABSTRACT

Toxicity is that degree of chemical substance to which it can damage an organism or plant. Basically toxicology is dose-dependent, which means any substance can lead to intoxication when taken in too high doses. Mainly there are four types of toxic entities viz. chemical, biological, physical and radiation. Organic chemical toxicants include methyl alcohol, pesticides, heavy metals, pollutants, etc. Toxicity measured by its effects on the target whether it is organism, body organ, cell or tissue. However it is more difficult to determine the toxicity of chemical mixture than a pure chemical because each composition has its own toxicity. Toxicity can be affected by different factors like time of exposure, administration pathway, individual health etc. Pesticides, herbicides, fungicides etc. adversely affected our environment specially plant, soil and water through which it is passed on the human body which is further affected. There are so many instrumental methods for the detection and determination of toxicants like-spectrophotometer, chromatography, flame photometer, etc through which we can determine toxicants qualitatively and quantitatively.

Keywords: Toxicity, Chemical, Organic, Determination, Detection

MODELING AND SOFTWARE SIMULATION DESIGN OF MICROWAVE BANDPASS FILTER USING MICROSTRIP-TO-SLOTLINE TRANSITION

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ABSTRACT

Microstrip transmission lines in combination with slotlines plays a very important role in the design of Microwave Integrated Circuitry. An important component in microstrip-to-slotline circuitry is the well matched microstrip-to-slotline transition with low insertion loss. The major aim of this work is to provide design methodology and Simulation work for filter design. The empirical formulae are required to compute the geometrical parameter from the given electrical parameter. The Sonnet EM Simulator is used to design Filters. This paper presents the modeling and Software Simulation design of microwave band pass filter using microstrip-to-slotline transition. The proposed EM-Simulation offers a simple and compact structure with low insertion loss. A new type of Microstrip-to-Slotline transition band-pass filter is presented with a centre frequency operation at 18.6 GHz, which lies in the K-band frequency range. The filter is designed to be much smaller and simple compared to other microstrip bandpass filter. The simulation results are excellent and filter is suitable for integration within various microwave subsystems. For practical applications, design curves are given for 1.0 mm and 0.11 mm thick substrates. The transition is simulated using a commercially available Electromagnetic Sonnet Software Simulator. The methodology is applied to a planar transmission line filter modeling and more accurate results are achieved for designing a filter using microstrip-to-slotline transitions. It is these assumptions, like model accuracy, valid frequencies range etc that differentiate one work from another. The work is of practical relevance of Microwave designers.

Keywords: Microstrip-to-Slotline transition, Bandpass Filter, Scattering Characteristics, EM-Simulation and Microwave Filter Modeling.

MODELING AND SOFTWARE SIMULATION DESIGN OF MICROWAVE BANDPASS FILTER USING MICROSTRIP-TO-SLOTLINE TRANSITION

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slotline transition with low insertion loss. The major aim of this work is to provide design methodology and Simulation work for filter design. The empirical formulae are required to compute the geometrical parameter from given electrical parameter. The Sonnet EM Simulator is used to design Filters. This paper presents the modeling and Software Simulation design of microwave bandpass filter using microstrip-to-slotline transition. The proposed EM-Simulation offers a simple and compact structure with low insertion loss. A new type of Microstrip-to-Slotline transition band-pass filter is presented with a centre frequency operation at 18.6 GHz, which lies in the K-band frequency range. The filter is designed to be much smaller and simple compared to other microstrip bandpass filter. The simulation results are excellent and filter is suitable for integration within various microwave subsystems. For practical applications, design curves are given for 1.0 mm and 0.11 mm thick substrates. The transition is simulated using a commercially available Electromagnetic Sonnet Software Simulator. The methodology is applied to a planar transmission line filter modeling and more accurate results are achieved for designing a filter using microstrip-to-slotline transitions. It is these assumptions, like model accuracy, valid frequencies range etc that differentiate one work from another. The work is of practical relevance of Microwave designers.

Keywords: Microstrip-to-Slotline transition, Bandpass Filter, Scattering Characteristics, EM-Simulation and Microwave Filter Modeling.

SILVER NANOPARTICLES: SYNTHESIS AND ITS ANTIBACTERIAL ACTION

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ABSTRACT

Silver nanoparticles are particles of silver which are in the range of 1 and 100 nm sizes. Silver has antibacterial and antiviral properties. For centuries people have used silver for the antibacterial qualities because silver has a naturally occurring element, is non-toxic, and does not accumulate in the body to cause harm and considered safe for the environment. The silver nanoparticles have been widely used in the fields of chemistry and related branches due to their high surface to volume ratio and excellent conducting capability. The major applications of silver nanoparticles in the medical field include diagnostic applications and therapeutic applications. Different preparation methods have been reported for the synthesis of silver nanoparticles, such as electron irradiation, chemical reduction, photochemical methods, biological artificial methods and microwave processing. The chemical reduction is one of the most commonly methods for the synthesis of silver nanoparticles by inorganic and organic reducing agents. In general, different reducing agents such as sodium borohydride, sodium citrate and N, N-dimethylformamide and ammonium formate are used for the reduction of the silver ions in the aqueous or non-aqueous solutions. Silver nanoparticles have the ability to anchor to the bacterial cell wall and subsequently penetrate it, thereby causing structural changes in the cell membrane like the permeability of the cell membrane and death of the cell. There is the formation of pits on the cell surface and there is an accumulation of nanoparticles on the cell. There have been electron spin resonance spectroscopy studies that suggested that there is the information of free radicals nanoparticles when it contact with the bacteria.

Keywords: Silver nanoparticles, Diagnostic applications and therapeutic applications, Synthesis, Chemical reduction

TREATED WASTE WATER: A SMART SOLUTION FOR IRRIGATION OF VEGETABLE CULTIVATION AND PLANT GROWTH IN PERI-URBAN AREA

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ABSTRACT

Irrigation is an important activity in agriculture. It consumes a substantial amount of available water. Increasing demand of water not only for drinking purpose but also for irrigation, which uses the freshwater resources

conventionally, has become an issue on account of increasing urbanisation. The need of the time is to find alternative sources of water for the purpose. Using treated wastewater for irrigation has emerged as a smart solution. The treated wastewater produced as effluents from sewage systems of urban communities represents non-conventional renewable water, which could be an attractive and cheap source to be used for agriculture, nearby the urban centres.

The constituents in wastewater concern to farmers include-Suspended solids of which filtration may be needed particularly with micro-irrigation systems; Nutrients in order to adjust fertilization; Salinity in order to estimate leaching fraction and select appropriate cropping pattern; and Pathogens for precautionary measures, selecting cropping pattern and choosing the appropriate irrigation system.

Wastewater treatment with primary, secondary and tertiary steps can be used for irrigation of vegetables effectively which can help to reduce the use of natural water resources on one hand and on the other wastewater reuse will also reduce the discharge of effluents into freshwater ecosystems. In addition, wastewater contains high amounts of organic matter and nutrients which are beneficial for plants and hence avoids fertilizer usage. The suspended, colloidal and dissolved solids present in wastewater contain macro-and micronutrients, which are essential for crop nutrition, include nitrogen, phosphorus and occasionally potassium, zinc, boron, and sulphur. Other macro and micronutrients may also be present. In addition, the organic matter in the wastewater beside its long-term effect on soil fertility, it can also contribute to the soil structure stability.

The nutrient content of the wastewater may exceed the plant's needs and thus pose a potential source for underground water pollution. It may also cause problems related to excessive vegetative growth, delayed or uneven maturity, or reduced quality of the irrigated crops. The fertilizing potential of treated wastewater due to nutrients might be an asset for crops but might also be a source of pollution for the environment and health issues. An analysis of treated wastewater for irrigation in a rational, profitable and environmentally sound way is needed.

The most appropriate wastewater treatment is that which provides and secures effluents with the chemical and microbiological quality required for a certain specific use at low cost and minimal operational and maintenance requirements. The present paper attempts to analyse the components present in wastewater. It also attempts to find out the level of the nutrient content of the wastewater and different chemicals needed for the treatment process and creating a balance of such nutrients so as to avoid ill health effects caused due to irrigation of vegetable crops with treated water in urban areas.

Keywords: Wastewater, Treatment, Micronutrients, Irrigation, Suspended solids

CURRENT TRENDS IN GUNSHOT RESIDUE EXAMINATION IN CONTEXT OF FORENSIC BALLISTICS

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ABSTRACT

Criminal activities involve the use of different arms and ammunitions firearms is one of them. They are comparatively easily available adding to rate of crimes. As they can be used from distance it becomes difficult to detect the user. For an investigation of the crime which involves the use of firearm, forensic science helps in an effective way. Examination of such advanced firearms is done under forensic ballistics. Forensic ballistics deals with the study of projectile motion of object. The GSR, cartridges, fragments, bullets are used to establish link between the victim, the suspect and the crime scene. Gunshot Residue is the chemical and particulate component (tiny particle of primer and gun powder) of gases released when the bullet is discharged. GSR is the most scrutinized sources of evidences and helps in crime investigation. GSR particles vary in shape and size its analysis by a forensic experts helps to answer the queries related to-Entry, exit, distance and direction of firing and also the involvement of a person suspected of the crime.

Different techniques are used to examine GSR which helps in detecting metallic particles, source of gunshot residue and other needed information. Electron Microscopy coupled with Energy Dispersive X-rays Spectroscopy (SEM-EDX) is one of the best instrumental techniques which is sensitive, reliable, efficient; used to reveal elemental composition and morphology of particles of GSR. Being the best technique till now, its use is beneficial in the entire forensic science laboratory for getting the reliable result of GSR examination in forensic investigation. This paper attempts to present

results of an investigation of Gunshot Residue with the help of different techniques and chemical analysis of evidences of crime involving firearms.

Keywords: Forensic Ballistics, firearms, GSR examination, SEM-EDX

ANALYSIS OF *IN VITRO* ANTIOXIDANT ACTIVITY OF *PHASEOLUS VULGARIS* L. PLANT EXTRACTS

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ABSTRACT

Free radical generates continuously in the human body as a part of various metabolic pathways. These free radicals or Reactive oxygen species (ROS) play physiological role in our body, but when produce in excess can be harmful and give rise to a condition called Oxidative stress, responsible for chronic diseases. Studies have shown that with the use of antioxidants, such damage can be controlled. Natural products from plant origin provides us with the ancient wisdom of medicine, loaded with the potential to combat diseases like Cardiovascular, Neurodegenerative, Arthritis, Pulmonary etc. Studies have been conducted on *Phaseolus vulgaris* L. (common bean also called green bean) plant extracts (Pet ether, Chloroform, Methanol) with an aim to evaluate the *in vitro* Antioxidant potential. The antioxidant potential was determined with DPPH, superoxide radical scavenging assay, and reducing power assay. The results of DPPH studies reveal that methanol plant extract shows significant scavenging activity with IC₅₀ value of 85.84±0.08 µg/ml, which is close to standard Ascorbic acid. The superoxide radical scavenging potential of methanol was found to be 46.79±0.09 µg/ml AAE, which is higher as compared to chloroform and pet ether extract whereas ascorbic acid being the highest. Reducing power assay was evaluated by making various concentrations of extracts, it was found as the concentration increases reducing the power of extracts also increases, highest being ascorbic acid followed by methanol>chloroform>pet ether. *Phaseolus vulgaris* L. shows significant antioxidant ability which can be further explored and utilized in health beneficial prospects.

Keywords: Superoxide radical scavenging assay, DPPH, Reducing power assay, *Phaseolus vulgaris* L., Oxidative stress, Reactive oxygen species, Common bean

APPLICATION OF NANOTECHNOLOGY FOR THE IMPROVEMENT AND GROWTH OF PLANTS ALSO MONITER AND CONTROL THEM BY THE USE OF CHEMICAL FERTILIZER

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ABSTRACT

Nanotechnology is the branch of Science and Engineering where System and devices are manipulating at Nano scale. These devices are useful and more utilizable. Due to judicious use of resources Nanotechnology becoming an important part in our life. It plays a significant role in engineering and medicines, Nowadays it becomes a useful tool for agriculture.

The Application of Nanotechnology at Agriculture sector bring significant interest. It can be used to enhance the rate and yield of production. It increase the efficiency of the tools and technology of the agriculture sector. Now Nano pesticides and Nano fertilizer used as crop nutrition.

The paper focuses on the growth of plants with the use of useful elements for plant growth and monitor and controls them with chemical fertilizer. Nanoparticle which becomes useful for plant growth and reduce loss of water etc.

Keywords: Nano Pesticides, Nanofertilizer, Nanoscale, Nanoparticle

MODERN INNOVATIONS IN ENGLISH LANGUAGE TEACHING AND LEARNI

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ABSTRACT

Teaching must include two major components sending and receiving information. The ever-growing need for good communication skills in English has created a huge demand for English teaching around the world. Millions of people today want to improve their command of English or to ensure that their children achieve a good command of English. Moreover, opportunities to learn English are provided in many different ways such as through formal instruction, travel, and study abroad, as well as through the media and the Internet. The worldwide demand for English has created an enormous demand for quality language teaching and language teaching materials and resources. Learners set themselves demanding goals. The demand for an appropriate teaching methodology is therefore as strong as ever. This paper deals with the traditional and innovative methods and approaches of teaching which are critically examined, evaluated and some modifications in the delivery of knowledge is suggested. As such, the strengths and weaknesses of each teaching methodology are identified and probable modifications that can be included in traditional methods are suggested. It also examines the present scenario of English language teachers as regards Information Communication Technology (ICT) integration and tries to determine if ICT skills of English language teachers in the light of existing infrastructure facilities are adequate to promote English language teaching and learning.

Keywords: Innovative, Communication, Technology

ROLE OF NANOTECHNOLOGY IN PROTECTIVE CLOTHING

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ABSTRACT

We are living in the era where we can feel and see the great impacts of technology on the every aspect of life including textiles industry. It is believed that, think big and make it happen! But now, it's time to think small-*really, really small*. Nanotechnology is all about size-working with material that is just a handful of atoms wide. There is no internationally agreed definition of Nanotechnology as yet, the most widely accepted definition of a "nano" sized particle is one with one or more physical dimension (height, width, depth) of less than 100 nanometers (nm) in size. To put that in context, 1 nm = 1 millionth of a millimeter, or to put it another way, up to 8,000 times finer than a human hair.

The application of nanotechnology in the field of textiles has led to the development of *Nanofibers*, *NanoCompositions*, *NanoPolymers*, *NanoFinishes*, etc. The subject nanotechnology in textiles is as vast as the universe so to restrict in few words is merely impossible. This paper summarizes the recent development of nanotechnology in textile areas including formation to finishing. Future developments of nanotechnologies in textiles will have a two-fold focus:

1. Upgrading existing functions and performances of textile materials
2. The new textiles with functions to be developed include
 - Fabrics that Stain, wrinkle, and liquid-resistant fabrics
 - Clothing that changes colour with the change
 - Clothing that emits substances by slow release;
 - Clothing which can absorb body odors
 - Sensors and information acquisition and transfer,
 - Multiple and sophisticated protection and detection;

- Health-care and wound healing functions
- Self-cleaning and repairing functions.

Thus Nanotechnology holds an enormously promising future for textiles. The development of ultra-fine fibers, functional finishes and smart textiles based on nanotechnology has endless possibilities and at present, the application of nanotechnology in textile has merely reached the starting line. In the future, one can expect to see many more developments in textile-based on nanotechnology.

Keywords: Nanotechnology, Clothing, Nanofibers, NanoCompositions etc

DESIGN AND SIMULATION OF MICROSTRIP PATCH ANTENNA ARRAY USING DIFFERENT SUBSTRATES

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ABSTRACT

In many applications it is necessary to design antennas with very high gain to meet the demands of long distance communication. The gain or directivity of the single antenna is less. To increase the gain and directivity the solution is antenna array. This can be done by increasing the size of antenna. Enlarging the dimensions of a single antenna often leads to more directive characteristics. Another method is increasing the dimensions of an antenna without increasing the size of individual elements is antenna array. It is one of the common methods for combining the radiation from a group of similar antennas in which the phenomenon of wave interference is involved.

Microstrip Patch Antennae play a unique role in the dissemination of wireless services. These have unmatched advantages over other modes viz. compact size, ease of fabrication, versatility and impressive performance characteristics. In this paper, a rectangular microstrip patch antenna array has been etched on Silicon, Taconic TLT-7, FR4 and CEM-1 as the dielectric substrates and a thickness of 1.6 mm applied for implementation with copper. The antenna fed through transmission Line. The CST software is based upon the Finite Integration in Technique (FIT) principle and gives excellent simulations which are consistent with actual fabrications. Important characteristics of microstrip patch antennae-like return loss, VSWR efficiency, Power, Excitation and gain plots are obtained. The simulated antennae are designed to operate at 4.6 GHz frequency which is used for wireless communications.

Keywords: Substrate, Finite Integration in Technique, Microstrip Patch Antenna Array, CST Software

AN EFFICACIOUS ROLE OF INDIA IN CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

With a tremendous increase in weather events and a population reaching over 1.3 billion, India is apparent on both the veracity of the climate crisis and the exigency of action. According to the report of Ernst and Young, India overtook the US to become the second-most attractive country after China for renewable energy investment. In just three years, India quadrupled its solar-generation capacity from 2.65 GW in 2014 to 12.29 GW in 2017. In the same period, wind grew from 23.35 GW to 32.17 GW. India planned to produce only electric vehicles from 2030. These considerations are not only exemplary for the environmental front or de-carbonize the economy but also lead to create more jobs, better income and cleaner society. This paper attempts to find out the role of India in policy formulation, initiation of major projects, investment decisions and socio-economic aspects related to climate change and sustainability.

Keywords: Renewable Energy Investment, De-carbonized Economy

APPLICATION OF RAMAN SPECTROSCOPY IN PAINT EXAMINATION: A FORENSIC APPROACH

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ABSTRACT

Paint evidence is found in the majority of hit-and-run cases, so it can be powerful forensic evidence, or evidence that can be utilized to solve crimes as providing a link between a victim and the responsible vehicle. Paint evidence may also be present in various other types of crimes, including burglary and homicide cases. Paint mainly consists of complex heterogeneous matrices which are a mixture of pigment/extender, additives, binders, solvent and coating. Paint analyses are a particular challenge due to the durability and ubiquity of paint films. The fundamentals of forensic paint analysis are covered and characterized by a number of technique as infrared spectrometry (IR), electron microscopy-x-ray spectroscopy (SEM-EDS and WDS) elemental analysis, pyrolysis-gas chromatography-mass spectrometry (PGC-MS), color-imetry and refractive index determinations. Dyes are further analyzed by thin-layer chromatography (TLC), and x-ray diffraction (XRD). Among these techniques, FTIR is the best-proven technique for analysis but Raman spectroscopy is relatively new to this forensic application.

This technique easily characterized all matrix of paint and reveal all information that will be evaluated and integrated to produce an overall compositional profile. The contribution of the Raman method for the examination of these types of evidentiary materials will be described as well as the factors, which will show why this technique is suitable for the forensic endeavor. The literature offers abundant examples that show how Raman spectroscopy produces data that provide a very high degree of discrimination between samples, can perform non-destructive microscopical *in situ* analyses, requires minimal or no sample preparation, and produces data that can be easily stored for database purposes.

In this review article, a comprehensive review of the forensic applications of Raman spectroscopy for the characterization, differentiation, comparison, and identification of trace evidence and questioned documents, consisting of paint and ink, respectively, is presented. Hence, FTIR and Raman spectroscopy is one of the most recent and updated methods which is more accurate than the other application.

Keywords: Raman spectroscopy, Non-destructive examination, Paints, FTIR

ADSORPTION OF BROMO CRESOL GREEN DYE FROM WATER USING TEMPLE FLORAL WASTE (*AEGLE MARMELOS*) LEAVES AS AN ADSORBENT

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ABSTRACT

Activated carbon prepared from *Aegle marmelos* leaves has been used as an adsorbent for the removal of Bromo cresol green dye from water solution. Leaves were collected from temples of Vidisha city for adsorbent preparation. Effects of variable parameters like contact time, initial dye concentration and adsorbent dosages were studied. For present work the adsorption experiment conducted at different initial dye concentration 25 to 250 mg/l, adsorbent dose 0.2 to 0.6 gm. and contact time 10 to 70 minutes under room temperature in batch adsorption mode. The maximum adsorption of BCG dye was found to be: adsorbent dose (0.6 gm), initial dye concentration (50 mg/l) and contact time (60 min). The maximum monolayer capacity Q_m obtained from the Langmuir was 22.1 mg/g with a high correlation coefficient (R^2 0.9967) and the value of K_f coefficient from the Freundlich isotherm was found about 1.82g/g with correlation coefficient R^2 0.9482. The experimental results revealed that both the models are well fitted for the sorption system. Both first-order kinetic model and second-order kinetic model provided good correlation for the adsorption of BCG on leaves adsorbent. Thus from the results of adsorption data, it was concluded that *A. marmelos*

leaves were found efficient and cost-effective adsorbent for the treatment of dye effluents and can also give a good suggestion for the temple floral waste management.

Keywords: Adsorption, Bromo cresol green, Isotherm, Kinetics, *A. marmelos*, Temple waste

T-SHAPE PATCH ANTENNA PERFORMANCE STUDY WITH RESPECT TO FEED LINE POSITION

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ABSTRACT

Antennas are a very important component of communication systems. By definition, an antenna is a device used to transform an RF signal, traveling on a conductor, into an electromagnetic wave in free space. Antennas demonstrate a property known as reciprocity, which means that an antenna will maintain the same characteristics regardless if it is transmitting or receiving. An antenna is a device to transmit and/or receive electromagnetic waves. Electromagnetic waves are often referred to as radio waves. Most antennas are resonant devices, which operate efficiently over a relatively narrow frequency band.

The design of the Antenna system is very important in a transmitting station. The antenna must be able to radiate efficiently so the power supplied by the transmitter is not wasted. An efficient transmitting antenna must have exact dimensions. The dimensions are determined by the transmitting frequencies.

A Microstrip antenna is one which offers low profile and lightweight. It is a wide beam narrowband antenna that can be manufactured easily by the printed circuit technology such as a metallic layer in a particular shape is bonded on a dielectric substrate.

T-SHAPE Microstrip Patch Antenna using Sonnet Software and to see the effect of length/thickness of a feed line on a T-SHAPE Microstrip Patch Antenna and to analyze what thickness/length of feed line is suited best for a particular frequency.

Keywords: Electromagnetic Waves, Patch Antenna, Feedline, Simulation, Sonnet Software

USE OF THIRD-PARTY ONLINE POLL SOFTWARE FOR POWERPOINT BASED QUIZ TESTS IN CLASSROOM TEACHING

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ABSTRACT

In order to automate the teaching-learning process use of computerised student response system becoming a new trend. There are two types of such systems available-one which are hardware-based offline (Voting meter type) and another is an online cloud-based polling software. First one provides multiple answer input pads, receiver plus software are very expensive while online poll website viz. poll maker. com, Easy poll. com and direct poll. com provides a good and cheap solution. As the polling software works on iOS or android platforms which most of the students have in their smartphones so no separate answering pad is required.

Classroom teaching in biology involves the use of illustrations and images to understand the subject. Powerpoint presentation is an effective tool. Present study involves the testing of one such online polling software 'direct poll'. This software works in three easy steps, 1. Creating a poll by putting a question and its multiple answers in a given field. 2. After saving your poll software provide three links first by which questions to be sent to Student's URL on their mobile device, second which shows the result of voting and 3. Third one by which you can arrange the result according to token no. allotted to students. If one adds the link of this website in the last slide of the lecture presentation one can easily collect the learning response of each student. The software is tested for its feasibility for internal assessment tests and lacunas are discussed.

Keywords: Polling software, MS PowerPoint, Quiz test

NANOTECHNOLOGY FOR CANCER TREATMENT

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ABSTRACT

Nanotechnology is used for prevention, diagnosis, and treatment. Nanotechnology offers a promise for the targeted delivery of drugs, genes and protein to tumor tissue and therefore alleviating the toxicity of anticancer agent in healthy tissues. Cancer is one of the leading causes of death worldwide. Death from cancer are continuously rising worldwide with a projection of about 12 million deaths from cancer in 2030. Nanotechnology is one of the most rapidly growing fields in the 21st century. Many different types of nanosystems have been utilized in diagnostics and therapeutics of various diseases. To subside the disadvantages of conventional cancer therapeutics, nanotechnology has been given considerable attention. In this paper, the current nanotechnology that can be utilized in oncological interventions will be discussed. These mainly include arrays of nanocantilevers, nanotubes and nanowires for multiplexing detection, multifunctional injectable nanovectors for therapeutics and diagnostics. It is demonstrated how nanotechnology can help solve one of the most challenging and longstanding problems in medicine, which is how to eliminate cancer without harming normal body tissue. This article reviews current nanotechnology platforms for anticancer drug delivery, including polymeric nanoparticle, liposomes, dendrimers, nanoshells, nanotubes, superparamagnetic nanoparticles and nuclear acid-base nanoparticle [DNA, RNA interference (RNAi), and antisense oligonucleotide (ASO) as well as nanotechnology for combination therapeutics strategies, for example, nanotechnology combined with multidrug-resistance modulator, ultrasound, hyperthermia, or photodynamic therapy. The review increases awareness of advantages in cancer therapy.

Keywords: Nanotechnology, Cancer, Nanoparticles, Liposome, Nanowires, Nanotubes and Superparamagnetic nanoparticles

TOXIC EFFECT OF HEAVY METAL ON THE PRIMARY METABOLIC CONTENTS OF MAIZE

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ABSTRACT

Maize is one of the important cereal crop in developing countries after wheat and rice. It is also an abundant source of starch and their various varieties are available in the world. But their growth and quality of seed were dependent on water and soil quality. Various toxic chemicals reached in crop root by water, soil and chemical pesticides. Mercury is one of the heavy metal which affects plant growth and their metabolites. 05 plants were grown into laboratory conditions and then made a dilution series of mercury with different concentrations. 100, 200, 300 and 400µg mercury were dissolved into 500 ml distilled water respectively and treated to these 04 plants with control till 30 d. After 30 d, chlorophyll and protein quantities were measured and found degraded quantities continuously.

Keywords: *Maize*, Toxicity, Mercury, Protein

“QUANTITATIVE DETERMINATION OF HEAVY METALS IN DRINKING WATER SOURCES OF VIDISHA CITY DURING SUMMER SEASON AND THEIR COMPARATIVE STUDIES WITH THE PREVIOUS DATA”

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ABSTRACT

Urbanization and Industrial activities lead to water contamination. It's a serious problem now a day. Analysis of the water quality is essential to take safety measures to protect and preserve the natural ecosystem. The present analysis is aimed to assess the changes occurred after the previous study in terms of heavy metal concentration. Same

sampling stations are selected for the present study, which was previously analyzed in the year 1999-2000 and for those sampling stations drinking water quality is investigated. A chemical analysis of drinking water samples was carried out. Samples were collected during the summer season of 2019 from ten sampling stations of the Vidisha city. A number of heavy metals such as Cu, Zn, Mn, and Fe were analyzed for each water sample using atomic absorption spectrophotometry. During the study, it was found that the concentrations of heavy metals were within the safe limit, as suggested by WHO and BIS. The obtained values were compared with the values of heavy metal concentration obtained in previous study during 1999 to 2000. The changes found were minor and not beyond the permissible limit so the water from all the locations and sources was found to be safe as drinking water.

Keywords: Drinking water, heavy metal, urbanization, comparative studies

COMPARATIVE ACCOUNT OF *IN VITRO* ANTIOXIDANT ACTIVITY OF CINNAMOMUM TAMALA AND CINNAMOMUM CASSIA

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ABSTRACT

Cinnamomum cassia also called Chinese cinnamon, is an evergreen tree which finds its origin in southern China while *Cinnamomum tamala* is also called Indian bay. We compared the *in vitro* antioxidant activity of leaves of both the spices. The plants were collected and extracted with different solvents like methanol, acetone, DMSO, water and chloroform. Phytochemical investigation was carried out for carbohydrates, proteins, glycosides, alkaloids, saponins, flavonoids, terpenoid, tannins and phenolic compounds. The extracts were also analyzed for *in vitro* antioxidant activity. Antioxidant activity was measured in terms of DPPH radical scavenging and chelation power on ferrous ions. Total phenol content was determined by the Folin-Ciocalteu reagent method. The methanol extract showed good DPPH free radical scavenging activity of *Cinnamomum tamala* with IC₅₀ 156.63 µg/ml and *Cinnamomum cassia* with IC₅₀ 193.94 µg/ml. *Cinnamomum tamala* had also lowered the level of Lipid-Peroxidation and showed a significant increased level of Super Oxide Anion Scavenging activity and Glutathione.

Keywords: Antioxidant activity, *Cinnamomum tamala*, *Cinnamomum cassia*, DPPH, free radical scavenging, superoxide anion scavenging.

PHYSICOCHEMICAL AND BIOLOGICAL ANALYSIS OF DRINKING WATER OF THE SHIVNA RIVER

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ABSTRACT

The Shivna the holy river passes from district Mandsaur (M. P.) but it is greatly unfortunate that it is highly polluted due to the addition of dirty drainages which mingle into it at different places for a long time. The Shivna river water samples were collected from five different stations that are situated at different places situated on the bank of river at Mandsaur. Drinking water of the Shivna river quality was determined with different parameters such as pH, chloride, nitrate etc. and all parameters were compared with standard WHO, ICMR and CPCB. Out of them at five stations the water samples of two stations' S-1 and S-2 were under specific parameters while the other three stations S-3, S-4 and S-5 were not suitable for drinking and even bathing due to the pollution with discharge of sewage water into the river.

Keywords: Physicochemical and Biological Parameters, MSW, Toxicity, Shivna River

MICROBES IN TERMITE GUT AND ITS MECHANISM–A REVIEW

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ABSTRACT

Termite called as 'Udai' or 'Deemak' which is associated with human civilization from time immemorial. These insects are often called as "white ants", but actually they are not ants. Termites cause damage to both cellulose and non-cellulose containing substances like living trees, crop plants, wooden electric poles, etc. Termites depend upon the microbes in their gut or digestive tract to digest the complex sugars in wood into simpler molecules that they can use for food. Cellulose is a major sugar in wood and it is broken down in the hindgut of the termite by microbes into molecules called short-chain fatty acids. The termite's microbes also produce gases during this breakdown process. They show a mutualistic relationship and typically convert 95% of cellulose into simple sugars within 24 h. More than 200 species of microbes form this community, producing different types of wood-busting enzymes, mainly cellulases, cellulases, hemicellulases, glucosidases and gluconases, during wood degradation. Studies suggest that lower termites utilize both endogenous and protozoal enzymes for cellulose digestion, while higher termites acquire enzymes from their diet instead of protozoal enzymes. Some termite species change their feeding habits with seasonal variations. These affect gut microbes population and therefore are responsible for enhancing their survival under changed environmental conditions.

Keywords: Termite, Cellulose, Glucosidases, Endogenous, Protozoal enzymes

DEGRADATION OF CHLOROPHYLL AND PROTEIN CONTENTS IN *SORGHUM BICOLOR* PLANT'S LEAVES WITH CADMIUM

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ABSTRACT

Sorghum bicolor is a grass (*Poaceae*) and its common name is jowar. Its seeds are used to make flour and cattle feed. Unites States are the largest producer of it. The growth of the plant is completely dependent upon soil and water quality because many chemical contents present in it. The heavy metals are more effective that affect genetic sequence. Cadmium is one of the heavy metal which was used for determination of affectivity on chlorophyll and protein contents. 11 plants were grown in laboratory and then treated with cadmium solution were prepared in distilled water. 100, 200, 300,400, 500, 600, 700, 800, 900 and 1000µg cadmium was dissolved into 500 ml distilled water respectively and treated to these ten plants with control till 30 d. Chlorophyll and protein contents were quantitatively measured in 30 d. The chlorophyll and protein quantities were degraded continuously.

Keywords: *Sorghum bicolor*, Cadmium, Toxicity, Primary Metabolites

TOXICOLOGICAL EFFECT OF *LANTANA CAMARA* LINN. LEAVES ON *CHIRONOMUS* LARVAE FOR STRESS GENE

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ABSTRACT

Lantana camara Linn. leaves are a good source of secondary metabolites but it also showed pharmacological and toxic activity. The alkaloids, flavonoids, glycosides, phenol, lignins, sponins, sterols and tannins presented in the screening

analysis of *L. camara*. These contents have specific activity against specific diseases. The methanol has good property for the extraction of metabolic contents. 2% *Lantana camara* solution were mixed with food and treated *Chironomus larvae*. Then larvae were stained with X-gal dye and found blue color complex in salivary gland where heat shock proteins generate. HSPs react with this dye and make blue color complex.

Keywords: *Lantana camara* Linn., *Chironomus larvae*, Toxicity, Secondary Metabolites

HEMATOLOGICAL ACTIVITY OF GUDUCHI AND GREEN TEA EXTRACT ON NICOTINE-INDUCED TOXICITY IN MICE

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ABSTRACT

This study was designed to observe the effects of nicotine on various hematological parameters in adult male mice. A total of 30 mice were divided into six groups; control (n=6) and test groups II, III, IV, V, VI (n=6 comprise in each group). After treatments blood was collected on 0th, 30th and 60th days. Hematological parameters were assessed by using bioanalyzer. Statistical analysis was performed for comparison between the groups by using Dunnett's test. The white blood cells (WBC) were found significantly higher in a nicotine treated group compared to the control group, while the significant decrease was observed in hemoglobin and hemocrit and platelets in the nicotine treated group. In contrast the differential count viz. neutrophil, eosinophil, monocyte, lymphocyte, basophil were found significant ($p \leq 0.05$) compared to the control group and test groups II, III, IV, V and V respectively. It is concluded that nicotine administration in mice resulted in toxic effects on various hematological parameters. Green tea and guduchi helps more to wake up the immune system and boost the body of the person who regularly consumes nicotine.

Keywords: Nicotine, Hematological, Dunnett's test, Mice, Green tea and guduchi

ADDITIVE MANUFACTURING (INNOVATION IN CHEMISTRY)

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ABSTRACT

Additive manufacturing (AM), sometimes referred to as 3D printing, is a manufacturing process used to produce three-dimensional solid parts and components. Objects are created using a series of additive layers put down in succession, each slightly different than the one before it, to create a finished 3-D part. Since the material is added to create the part, this process is known as additive manufacturing. This process is completely the opposite of traditional part production in which a part is made by removing material through a machining process.

An example of a complex part, manufactured as one piece through binder jetting, placed on the original GTP tungsten carbide powder WC701. GTP developed this powder grade especially for the use in 3D binder jetting applications.

There are numerous advantages to the AM process, including

- Processing of complex parts to near net shape
- Minimizes need for expensive tooling
- Reduces prototyping costs
- Faster from prototype to production
- Potential to create distinctive alloys/microstructures
- Smaller environmental footprint

- Production is easily adapted to change in parts
- Lighter weight alternative to solid parts

GTP is currently developing tungsten, molybdenum and tungsten carbide-cobalt (WC-Co) based powders ideally suited for achieving high-density parts fabricated using different additive manufacturing technologies like binder jetting and powder bed fusion (Selective Laser Sintering, Electron Beam Melting, etc.).

An ExOne binder jet 3-D printer at GTP's headquarters in Towanda, USA. In close cooperation with Exone we optimized powder properties for binder jetting applications and are already able to print and sinter finished parts in small batches.

All the powders offered by GTP for the additive manufacturing market undergo exhaustive testing before and after sintering to confirm purity and density

Keywords: Manufacturing, Process, Traditional, Fabricated, Sintering, GTP, Exhaustive

NEW METHODS FOR REDUCING POLLUTION

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ABSTRACT

Environmental problems and concerns are increasing as our country is witnessing rapid industrialisation, massive urbanisation and tremendous population growth. Industrial, agricultural and domestic activities are responsible for deteriorating the environmental quality. Thus proper enforcement of regulatory measures is required to sustain the diminishing resources and to meet the growing needs of the people.

Hazardous wastes have become an important environmental and public health issue across many countries in the world. The first priority of hazardous waste management is to reduce the quantity of wastes it can be done by the process of modifications waste concentration and waste segregation.

The treatment technologies can be divided into the following categories like physical treatment, chemical treatment, biological treatment, solidification and incineration. Physical processes for the separation of liquids and solids pollutants are screening, sedimentation, centrifugation, floatation, filtration, evaporation, stripping, Chemical treatment oxidation-reduction reaction, neutralisation, precipitation, Biological treatment is composting is a process where biodegradation of waste materials takes place. It can be defined as the decomposition of heterogeneous organic matter by a mixed microbial population in a moist, warm and aerobic environment. The end product is compost, composting can be done both aerobically and anaerobically, through anaerobic composting is relatively expensive.

Keywords: Pollution, Compositing, Methods

CHARACTERIZATION OF A FLAVONONE FROM *LAWSONIA INERMIS*

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ABSTRACT

Lawsonia inermis (Lytharaceae), commonly known as "Mehndi", is a shrub, cultivated throughout India. All parts of the plant were reported to have significant medicinal properties. Bark was given in jaundice, skin diseases and leprosy, leaves were used externally in headache. Compounds of significant medicinal value were reported by earlier workers. Substituted xanthenes were obtained from all parts of plant, stearic palmitic oleic and linoleic acids were obtained from the seed. β -sitosterol and triterpenes were also obtained from the bark of *Lawsonia inermis*. A new flavonone

glycoside was obtained from *Lawsonia inermis*. Compound isolated by column chromatography and characterised by UV, ¹H-NMR spectroscopy and Mass spectrometry.

Keywords: *Lawsonia inermis*, flavonone, UV, ¹H-NMR spectroscopy

STATISTICAL ANALYSIS OF GROUNDWATER QUALITY PARAMETERS

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ABSTRACT

Quality of groundwater of Berkheda sector C, BHEL, Bhopal, M. P, India has been determined by analyzing its physico chemical Parameters such as Temperature, Turbidity, pH, Electrical conductivity (EC), Total Dissolved Solids (TDS), Total Alkalinity (TA), Total Hardness (TH), Calcium Hardness (CaH), Magnesium Hardness (MgH), Chloride (Cl), Sulphate (SO₄) and Nitrate (NO₃). Samples were analyzed for a periods of one year from November 2018 to October 2019. Water quality is dependent on the type of the pollutant added and the nature of mineral found at the particular zone of the bore well. Estimation of water quality index through the formulation of appropriate using methods and evaluate the quality of tube well water by statistical analysis. Interrelationship studies among different water quality parameters are very helpful in understanding the geochemistry of the studied area. The regression equations for the parameters having significant correlation coefficients are useful to estimate the concentration of other constituents. A positive and significant correlation has been observed among various parameters.

Keywords: Groundwater, Statistical analysis, Correlation coefficients

TOXICITY OF ENVIRONMENTAL MERCURY

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ABSTRACT

Mercury exists naturally and as a man-made contaminant. The release of processed mercury can lead to a progressive increase in the amount of atmospheric mercury, which enters the atmospheric-soil-water distribution cycles where it can remain in circulation for years. Mercury poisoning is the result of exposure to mercury or mercury compounds resulting in various toxic effects depend on its chemical form and route of exposure. The major route of human exposure to Methyl Mercury is largely through eating contaminated fish, seafood, and wildlife which have been exposed to mercury through the ingestion of contaminated lower organisms. The highest concentration is found in large predatory species. Methyl Mercury toxicity is associated with nervous system damage in adults and impaired neurological development in infants and children. Mercury poisoning has been reported in many parts of the world from mercury released from chlorine production facilities and as a result of mistaken consumption of organo-mercury treated grain intended for use as a pesticide. Methyl Mercury is lipid-soluble and tends to bio-accumulate in organisms as well as through the food chain.

Keywords: Environmental Mercury, Poison, Methyl Mercury, Chemical

ADSORPTION STUDIES ON THE REMOVAL OF PHENOL RED AND METHYLENE BLUE DYES USING ACTIVATED CARBON AS AN ADSORBENT

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ABSTRACT

Textile wastewater effluents contain harmful dyes which cause hazard to the environment therefore these dyes need to remove from the water bodies. But dye removal from textile wastewater has been a big problem over the last

decades. The adsorption is a good and ideal treatment for dyes removal from wastewater than other expensive treatments. Activated carbon was prepared from abundantly available *Ipomoea Carnea* stem waste. Activated carbon has been extensively used as a good adsorbent. This work deals with the study of phenol red and methylene blue adsorption on activated carbon. The adsorption characteristics and operational parameters were determined by monitoring different parameters such as the effect of pH, the effect of concentration of the dyes, amount of adsorbents and contact time. The adsorption phenol red and methylene blue were investigated using UV-Vis spectrophotometer at maximum absorption of 558 nm and 665 nm. The adsorption of dyes increased with increasing initial dyes concentration and adsorbent dosage. The Langmuir and Freundlich models adsorption were applied to describe the isotherm equilibrium and kinetic data was well described by a pseudo-second-order kinetic model. This study provides a low cost-effective and environment-friendly dyes removal process for textile wastewater treatment.

Keywords: Activated Carbon, Phenol Red, Methylene Blue, Adsorption, Isotherm Equilibrium.

FOOD AND SCIENCE

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ABSTRACT

Food science is the basic science and applied science of food; its scope starts at development, food engineering and packaging. Food science integrates this broad-based knowledge and focuses it on food. Overlap with agricultural science and nutrition and leads through the scientific aspects of food safety and food processing, informing the development of food technology. The Institute of Food Technology defines food science as "the discipline in which the engineering, biological, and physical sciences are used to study the nature of foods, the causes of deterioration, the principles underlying food processing, and the improvement of foods for the consuming public". Food Science is a multi-disciplinary field involving chemistry, biochemistry, nutrition, microbiology and engineering to give one the scientific knowledge to solve real problems associated with the many facets of the food system. The basis of the discipline lies in an understanding of the chemistry of food components, such as proteins, carbohydrates, fats and water and the reactions they undergo during processing and storage. A complete understanding of processing and preservation methods is required including drying, freezing, pasteurization, canning, irradiation, extrusion, to name just a few. The ability to carry out analysis of food constituents is developed along with statistical quality control methods. The microbiology and safety aspects of food must also be understood. Other topics covered include food additives, the Physico-chemical properties of food, flavor chemistry, product.

Keywords: Food science, applied science, food engineering, Food science integrates, agricultural science, biochemistry, nutrition

WATER SCARCITY AND SOCIETY

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ABSTRACT

Water scarcity can be simply defined as the lack of sufficient available water resources to meet the demands of water usage within a region. It includes-water crises, water shortage and water stress. The effects of scarcity for water can be classified into four broad areas-health, hunger, education and poverty. Water scarcity is one of the biggest challenge because safe drinking water is reducing year-by-year. Water scarcity can be caused by either physical or by economic water scarcity. If there is no usable water left that can be used in order to help watering the crops and drive food for the humans to be fed as well as the animals, then they will starve. An individual shouldn't just stop to assume that the society they bear living in, is too advanced. They can either choose to save the same society by following a few simple acts of sustainable corrective choices, that would not only conserve their present but future, such choices can be redeemed as putting the water tap off while not in use, minimizing the flushing in toilets and reducing the time taken for a bath. The little steps might move the whole world and save it at the same time. In fact, not only certain measures

will result in the healing of water, but every little step will. The uttermost significant step is to start conserving water, is to learn water crises. A drop of water is worth more than the deliciously savory sack of gold for an extremely thirsty man. To conclude the problem of water scarcity, it needs to be tackled step-by-step. Our strength lies in unity. We can prevent this problem from getting worse and ensure access to healthy clean water for everyone.

Keywords: Water, Scarcity, Conserving Water, Saving Society

COMMON COUPLED FIXED POINT THEOREM USING CLRG PROPERTY IN COMPLEX VALUED RECTANGULAR (GENERALIZED) METRIC SPACE

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ABSTRACT

In this paper coupled fixpoint is obtain for four mappings using CLRg property in complex-valued rectangular (generalized) metric space.

Keywords: Complex valued metric space, coupled fixed point and CLRg property

RAPID AND SENSITIVE HPLC METHOD FOR DETERMINATION OF PENCILLIN G

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ABSTRACT

The objective of this study was to develop a high performance liquid chromatographic method for the determination of penicillin G. The quantification was carried out using a RPC-18 column in isocratic mode with mobile phase acetonitrile: water: sodium acetate. The detection was carried out at 245 nm which was used for direct evaluation of the chromatograms in reflection mode and the good linear relationship was found precisions and detection limits were validated and found to be satisfactory. The method is fully robust. The proposed method for estimation of penicillin G in dosage forms was found to be simple, accurate, rapid and economicals. The value of recovery was close to 100% indicating the reproducibility of the method.

Keywords: Rapid, HPLC method, Penicillin

ANTI-HISTAMINIC AND BRONCHODILATOR SCREENING OF *PRUNUS PERSICA* IN RODENT MODEL

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ABSTRACT

Aim: Asthma is a common long-term inflammatory disease of the airways of the lungs that involves a complex interaction of airflow obstruction, bronchial hyperresponsiveness and an underlying inflammation. The present study is intended to investigate the study of the anti-asthmatic activity of methanolic extract of *Prunus persica*. **Materials and Methods:** Bar test will be used to study the effect of extracts on clonidine-induced catalepsy, to determine indirect antihistaminic activity. Mice will be divided into four groups, six animals in each group. Group I: Control group treated with distilled water (5 ml/kg, p. o.) Group II: Standard group treated with chlorpheniramine maleate (10 mg/kg, i. p.) Group III treated with *Prunus persica* at a dose of 100 mg/kg Group IV treated with *Prunus persica* at the dose of 200 mg/kg. Clonidine 1 mg/kg s. c., subcutaneously, will be administered to all groups except normal group 30 min after treatment. In Bronchodilator activity, Overnight fasting of 24 h wistar rats were divided into four groups each

containing 6 animals, Group 1 was treated as control p. o. Group 2 received standard drug chlorpheniramine maleate (2 mg/kg) orally 30 min prior to exposure. Groups 3 received *Prunus persica* 200 mg/kg body weight p. o. Group 4 received *Prunus persica* 400 mg/kg body weight p. o. Result: The results of the present study revealed antihistaminic actions of different extracts of plant *Prunus persica*. In this study control group of animals showed convulsion during the first 3 min of the experiment. Prior treatment of *Prunus persica* extracts (100 and 200 mg/kg body weight) protected animals to a significant extent from the development of asphyxia produced by histamine aerosol confirming that it has an antihistaminic activity. Conclusion: It can be concluded that *Prunus persica*, higher dose of extract has significant bronchodilator activity against histamine. Conclusion: It can be concluded that *Prunus persica* has potential clinical application in the management of anti-histaminic disorders.

Keywords: Chlorpheniramine maleate, *Prunus persica*, Clonidine

HEPATOPROTECTIVE ACTIVITY OF LEPIDIUM SATIVUM EXTRACT IN RODENT MODEL

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ABSTRACT

Hepatotoxicity means damage to the liver caused by drugs and other factors resulting in problems in its functioning. Chemicals or drugs that cause hepatotoxicity are called hepatotoxins. The liver is the largest solid organ in the upper abdomen that aids in digestion and removes waste products and worn-out cells from the blood. The present study is intended to investigate the study of hepatoprotective activity of *Lepidium sativum* extract in a rodent model. Materials and Methods: Paracetamol induced hepatotoxicity model will be used to study the effect of extracts. Mice will be divided into four groups, six animals in each group. Group I: Control group is treated with normal Saline at 1 ml/kg body weight for 7 d. Group II: Vehicle group treated with normal Saline at 1 ml/kg body weight. Group III: 200 mg/kg extract-treated group: Extract was dissolved in normal saline and was administrated by oral route at a dose of 200mg g/kg body weight each for 7 d. Group IV: 400 mg/kg extract-treated group: Extract were dissolved in normal saline and was administrated by oral route at a dose of 400 mg/kg body weight for 7 d. On the seventh day, paracetamol suspension was given by oral in a dose of 750 mg/kg to all except rats in group I, after 24 h, all the rats were sacrificed under light ether anesthesia, and blood was collected in sterile eppendroff tube and allowed to clot. Then liver was isolated from animal for *in vivo* antioxidant assay and histology. Result: So it was observed that the animals treated with paracetamol resulted in significant hepatic damage as shown by the elevated levels of serum markers. Conclusion: *Lepidium sativum* leaf extract possess significant protective potential against Paracetamol induced Hepatotoxicity. Being one of the easily available trees it can be a good source of components with hepatoprotective agent.

Keywords: *Lepidium sativum*, Paracetamol, Hepatotoxicity

THE PSYCHOLOGICAL RESPONSE OF HEALTHCARE ENVIRONMENTS ON OCCURRENCE OF FIRE HAZARD

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ABSTRACT

Fire safety in health care facilities like hospitals, nursing homes, clinics presents a specialized response particularly in the evacuation process because of the diverse needs of users. Hospitalization presents specific stresses over and above those associated with illness. These range from environmental factors such as unfamiliar surroundings, to the lack of privacy and independence and uncertainty about ill-health outcomes. These factors adversely affect response of patient on occurrence of an emergency situation. There are certain fire incidences which have led to many victims and there are examples of catastrophic events which resulted in few fatalities. Hence cognizance of personnel behaviour in case of fire escape is essential to match occupants need with fire safety measures during an incident.

This paper discusses human behavior on the occurrence of fire hazard in hospitals in light of architectural and planning aspects. It is based on an attribution analysis of human reactions considering the psychological process to fires, which include an understanding of various terms like disaster, hazard, risk perception, response mechanism, the concept of panic and decision-making, combining with psychological deviation and cultural background. The analysis indicated that the quality of the design of physical environments affects response of non-patient and patient medical on exposure to an emergency situation. It is stressed that a psychological understanding of the crowd's activity and characteristics during emergency evacuations lead to better planning and management. It is aimed to suggest certain environmental design strategies which can promote improved outcomes in the present context.

Keywords: Healthcare, emergency, hazard, evacuation, response.

NET-ZERO ENERGY BUILDING APPROACH: A SOLUTION TO THE PARADOX OF ENERGY EFFICIENCY IN INDIAN HOUSING SECTOR

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ABSTRACT

Rapid urbanization, the rising income level of the large population base resulted in fast growth of the housing sector in India. The task of achieving the 10 million houses target by 2022 is coupled with increased the problems related to energy saving, energy security, and GHG emissions. The residential sector consumes 75% of the total energy consumed by the building sector. Despite of green building initiatives in place housing is yet one of the less frequently discussed aspects of sustainability. Indian housing sector needs a paradigm shift in its approach to address issues like energy scarcity, energy security, and GHG emissions as measures like low energy, low carbon and energy efficient buildings are not enough to satisfy demand for saving energy by and large. This research put forth the concept of Net Zero Energy Buildings (NZEB) as a cohesive solution to these problems. Various aspects of NZEB development are discussed in the context of Indian housing sector. The issues and challenges in the socio-technical transition from current practices to NZEB are explored to pave path for use of this concept for future development. It has been argued that large-scale uptake of NZEBs using renewable sources of energy will prove instrumental in achieving reduced energy and carbon footprints stimulating sustainable development in the context of Indian housing sector.

Keywords: Housing sector, Net Zero Energy Buildings, renewable energy, GHG emission reduction

EXPLORING OF THE RELATIONSHIP BETWEEN MATHEMATICS, MUSIC, AND ARCHITECTURE

SANJEEVANI PENDSE, V. A. GOKHALE, EEPA JOSHI

ABSTRACT

The interrelationship between art forms like architecture and music with mathematics can be traced back from historic times. In history, architects were mathematicians and also some mathematicians were worked as an architect. Use of mathematics is evident in works of Vitruvius while concepts borrowed from Pythagoras were later used in building proportions. Mathematics explains how strings vibrate at certain frequencies, and sound waves are used to describe these mathematical frequencies. Instruments are mathematical; cellos have a particular shape to resonate with their strings in a mathematical fashion. This research is aims to give an overview of this intricate relationship between mathematics, music and architecture by examining its different aspects. The use of mathematics in the creation of composition in music and architectural built-form is examined. It is aimed to investigate the relationships and commonalities between music and architecture and mathematics and the various theoretical approaches. This is theoretical-fundamental research carried out with a historical-descriptive method where data has been gathered through historical sources and field observations. What we know about the relation between architecture, and mathematic is largely based upon interpretive studies of historical texts using available resources and library

information. It will compare architecture, mathematics and music, the application of mathematics in architecture to obtain a definition and interpretation of component influencing architecture. It is aimed to elicit mathematical and geometric principles governing designs and principles of architectural design.

Keywords: Music, Pythagoras, Vitruvius, Frequencies, Architectural

NET-ZERO ENERGY BUILDING APPROACH: A SOLUTION TO THE PARADOX OF ENERGY EFFICIENCY IN INDIAN HOUSING SECTOR

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ABSTRACT

Rapid urbanization, the rising income level of the large population base resulted in fast growth of the housing sector in India. The task of achieving the 10 million houses target by 2022 is coupled with increased problems related to energy saving, energy security, and GHG emissions. The residential sector consumes 75% of the total energy consumed by the building sector. Despite of green building initiatives in place housing is yet one of the less frequently discussed aspects of sustainability. Indian housing sector need a paradigm shift in its approach to address issues like energy scarcity, energy security, and GHG emissions as measures like low energy, low carbon and energy-efficient buildings are not enough to satisfy demand for saving energy by and large. This research put forth the concept of Net Zero Energy Buildings (NZE) as a cohesive solution to these problems. Various aspects of NZEB development are discussed in the context of Indian housing sector. The issues and challenges in the socio-technical transition from current practices to NZEB are explored to pave path for use of this concept for future development. It has been argued that large-scale uptake of NZEBs using renewable sources of energy will prove instrumental in achieving reduced energy and carbon footprints stimulating sustainable development in the context of Indian housing sector.

Keywords: Housing sector, Net Zero Energy Buildings, Renewable energy, GHG emission reduction

PRELIMINARY PHYTOCHEMICAL SCREENING, QUANTITATIVE ANALYSIS OF FLAVONOIDS, AND ANTIOXIDANT ACTIVITY OF CRUDE PLANT EXTRACT: *FUMERIA OFFICINALIS*

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ABSTRACT

The aim of this study was to evaluate the antioxidant activity, screening the phytochemical compounds, and to assess the flavonoids present in the *Fumeria officinalis* to prove its uses in Indian folk medicines for the treatment of asthma. Antioxidant activity was analyzed by using the 2,2-diphenyl-1-picryl-hydrazyl-hydrate assay. Standard methods were used for the identification of alkaloids, glycosides, phenolic compounds, saponins, flavonoids, anthraquinones and carbohydrates. The quantitative separation was confirmed by absorbance observed in UV Systronic (2202) at wavelength 510 nm. The methanolic extract of *Fumeria officinalis* showed the antioxidant potential and powerful oxygen-free radicals scavenging activities and the IC₅₀ for the *Fumeria officinalis* plant was (20.69) near to the reference standard ascorbic acid (11.80). Rutin (20-100 µg/ml) was used as the standard in the estimation of total flavonoid content. The total flavonoid contents of *Fumeria officinalis* extract was calculated with a regression equation based on a standard curve ($y=0.001x+0.090$, $R^2=0.988$). Results showed that average Flavonoid substance in *Fumeria officinalis* as 202.33 mg RE/g extract.

Keywords: *Fumeria officinalis*, Flavonoid, Anthraquinones

PHYTOCHEMICALS IN CANCER PREVENTION: CURRENT STATUS

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ABSTRACT

Skin cancer is a life-threatening disease and their prevalence and risk have been increasing over the past three decades causing significant loss to human health worldwide. Skin is the largest human organ, our protection against various environmental assaults and noxious agents. Accumulation of these stress events may lead to the formation of skin cancers, including both melanoma and non-melanoma skin cancers. Although modern targeted therapies have ameliorated the management of cutaneous malignancies, a safer, more affordable, and more effective strategy for chemoprevention and treatment is clearly needed for the improvement of skin cancer care. Epidemiological studies including more than 250 populations indicated that people who take five different kinds of fruits and vegetables a day showed about 50% decrease in cancer incidence and development than not or less eating plant foods. Phytochemicals extracted from medicinal plants are often biologically active and has attracted the attention of researchers and pharmaceutical industries around the world. These phytochemicals also regulate several other molecular processes such as angiogenesis, metastasis and cell cycle to combat skin cancer. Evidence has indicated that the anti-carcinogenic properties of phytochemicals are due to their anti-oxidative, anti-inflammatory, anti-proliferative, and anti-angiogenic effects. In this review, we discuss the preventive potential, therapeutic effects, bioavailability, and structure-activity relationship of these selected phytochemicals for the management of skin cancers.

Keywords: Malignancy, Angiogenesis, Anti-proliferative

BLUE-LIGHT TECHNOLOGY IMPROVES IDENTIFICATION OF BLADDER CANCER

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ABSTRACT

Bladder cancer is the most common cancer of the urinary tract affecting more people. Most have non-invasive bladder cancer (NMIBC), which means cancer has not yet spread to the muscle. A new technology, known as Blue-light cytoscopy, can make this tumor easier to see during surgery so that doctors can do a better job of removing them. This procedure uses a cystoscope, a tube-like telescope that is inserted into the bladder through the urethra. The doctor is able to insert instruments through the tube during the procedure. CysviewR solution (less than 2 ounces) is a photosensitizing optical agent that is inserted through a catheter into the bladder one hour prior to the procedure and is absorbed by cancerous tissue. It causes tumors to show up as bright pink under blue light, making them much easier to see. Doctors, during the procedure, will toggle back and forth between white light and blue light. The standard white light cytoscopy is used to help find the cause of symptoms, to treat or monitor conditions. Doctor will inspect the bladder lining very closely for any abnormal growths or suspicious areas. During this inspection suspicious tumors are further inspected using blue light which makes cancerous tumors more visible and may highlight additional tumors.

Keywords: Cancer, Bladder cancer, CysviewR solution, Blue-light cytoscopy, Tumors

APPLICATION OF NANOTECHNOLOGY FOR THE IMPROVEMENT AND GROWTH OF PLANTS ALSO MONITER AND CONTROL THEM BY THE USE OF CHEMICAL FERTILIZER

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ABSTRACT

Nanotechnology is the branch of Science and Engineering where System and devices are manipulating at Nano scale. These devices are useful and more utilizable. Due to judicious use of resources Nanotechnology becoming an

important part in our life. It plays a significant role in engineering and medicines, Now adays it becomes a useful tool for agriculture.

The Application of Nanotechnology at Agriculture sector brings significant interest. It can be used to enhance the rate and yield of production. It increases the efficiency of the tools and technology of the agriculture sector. Now Nano pesticides and Nano fertilizer used as crop nutrition.

The paper focuses on the growth of plants with the use of useful elements for plant growth and monitor and controls them with chemical fertilizer. Nanoparticle has become useful for plant growth and reduces the loss of water etc.

Keywords: NanoPesticides, Nanofertilizer, Nanoscale, Nanoparticle

CORRELATIVE STUDY AMONG SOLAR WIND PARAMETERS, CORONAL MASS EJECTION AND SUNSPOT NUMBERS FOR SOLAR CYCLE-24

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ABSTRACT

This paper gives an observation regarding the interrelationship among a variety of solar activity (SA) parameters. A correlative study has been performed using the yearly data of various solar activity parameters, such as solar wind parameters, coronal mass ejection and sunspot numbers etc., for the time period 2007 to 2017, which is known as solar cycle-24. we show the correlation between the total number of CME's with sunspot numbers (R_z) and solar wind plasma speed with the total number of CME's, solar wind plasma temperature, sunspot numbers. Then we observed a good correlation between various parameters. The coefficient of correlation for total number of CME's Vs sunspot numbers (R_z) ($r=0.9355$) and for total number of CME's Vs solar wind speed ($r=-0.194$) and for solar wind plasma speed Vs solar wind plasma temperature ($r=0.9653$) and for solar wind plasma speed Vs sunspot numbers ($r=0.2352$). we have concluded that solar cycle-24 has initially displayed much less activity.

Keywords: Sunspot numbers (R_z), Coronal mass ejection (CME's), Solar activity (SA)

STUDY OF THE OLD MORTARS FROM THE HISTORIC BUILDING OF BHOPAL CITY

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ABSTRACT

The conservation and restoration of any historic building requires the selection of the correct matching materials based on the historical time and as per its role in the structure. These old mortars made up of binders like lime and locally available aggregates. The characterization of the mortars is to be done so that new mortar can be prepared of the same matrix, composition and strength so that structure may exhibit durability. This paper focuses on the study of the old mortars of the historic buildings made during the reign if the ruling Nawabs of the Bhopal. The analysis was based on the conventional techniques like lab testing for grain size distribution, EDX, SEM, XRD and lime percentage analysis. This system of analysis has been adopted for the first time for the historical building of Bhopal.

Keywords: Historic mortars, X-ray diffraction, Conservation, Bhopal

STUDY OF UPPER AND LOWER QURTILE OF FOF2 AT LOW LATITUDE STATIONS DURING 23rd SOLAR CYCLE

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ABSTRACT

We comparatively investigate the variability of foF2 for low latitude station Darwin (12.47S,130.85E) and Brisbane (27.47S,153.02E) for the year 2008 and 2014 during low solar activity period.

In the present study hourly monthly average values of foF2, seasonal variation and corresponding upper quartile, lower quartile and their percentage deviation have been calculated.

In this investigation, we observe that for both years 2008 and 2014 the values of the percentage deviation of the upper quartile and the lower quartile for Darwin is greater than Brisbane. In 2008, for winter the variation for the percentage deviation of UQ of Darwin is more in january than Brisbane, but for LQ the variation is almost the same whereas in 2014 the variation of both stations coincide in november. For equinox the variation for % deviation of Darwin is more in october than Brisbane for both UQ and LQ whereas in 2014 the variation for percentage deviation of foF2 of both the station is almost coincide in april and october for UQ. For summer the variation of % deviation for both stations are almost coincide in july for both UQ and LQ whereas in 2014 the variation of foF2 for darwin is more than the variation of foF2 for brisbane.

Keywords: Vriability, foF2(critical frequency), Solar activity, lower quartile, Upper quartile

SPENT CATALYST COMING OUT FROM AMMONIA SYNTHESIS FERTILIZER PLANT AND IMPACT ON ENVIRONMENT

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ABSTRACT

Ammonia is primarily used as nitrogenous fertilizer and as a raw material of inorganic compounds including nitric acid, ammonia salts, cyanide and organic compounds, such as amines, sulfanilamide and so on. In addition, ammonia is also an excellent refrigerant. Since ammonia is a key raw material for industry and agriculture, the process of ammonia synthesis has an extremely important position in any economy. During ammonia synthesis in nitrogenous fertilizer plant for the production of nitrogenous fertilizer and other products, the major reactions of production and purification of synthesis gas and the synthesis of ammonia, all the carried out over different catalysts (Prajapati, R. P., Sharma Anand and Tiwari, D. R., 2010). At least eight kinds of catalyst used in the whole process, where natural gas or naphtha is used a feedstock and steam reforming is used to produce synthesis gas. These catalyst, are Co-Mo hydrogenation catalyst, zinc oxide desulfurizer, primary and secondary, steam reforming catalysts, high and low temperature shift catalysts, methanation catalyst and ammonia synthesis catalyst etc. In every catalytic operation, the activity of the catalyst gradually decreases due to structural changes, poisoning, or deposition of extraneous material. A catalyst, which can no longer perform its original duty, is referred to as "spent catalyst". In such cases, fresh catalysts have to be substituted and the spent catalyst will be discarded as solid waste material. Disposal of spent catalyst is a problem as it falls under the category of hazardous industrial waste. Environmental laws concerning spent catalyst disposal have becomes increasingly more serve in recent years. Metals such Ni, Mo, Fe, Co, Cu, Zn and Cr present in the spent catalyst can leached by water after disposal and pollute the environment. These metals exert a wide variety of adverse effects on human being. Some of the metals have an extremely long biological half-life that essentially makes it a cumulative toxin. Also some metals are carcinogenic in nature. Hence these solid waste materials which are causing serous environmental problems can act as artificial ores. The valuable metals can be recovered from these spent catalyst waste (Marafi M., and Stanislaus, A., 2003). Recovery of metals from spent catalysts solid wastes has been an important issue not only from economic aspect but also for recycling rare natural sources and reducing the spent catalyst waste to prevent environmental pollution.

Keywords: Catalyst, Deactivation, Spent catalyst, Ammonia synthesis, Solid hazardous waste, Environmental pollution, adverse effect, Metal reclamation

AN INNOVATIVE PRACTICE IN LABORATORY-BASED EDUCATION

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ABSTRACT

Innovation is the Pinnacle of human thinking abilities that helps human to improve, achieve the high steps and it assist him in solving the problem. For a teacher, it is a technique or combination of methods adopted for profound learning of his students achieving goal of education attempting something new. Being innovative is about looking beyond what we currently do well, identifying the great ideas of tomorrow and putting them into practice. Teachers are guide and facilitator, as same technique cannot be applied in a heterogeneous class, it becomes very challenging job for a teacher to acquaint with varied techniques, to prepare for innovation in the traditional method of teaching, involves more of mathematical, logical, spatial and visual intelligence and there are children who need help to strengthen these opportunities to use other intelligence to understand and explore the subject. New approaches have been initiated during the last two decades by employing Virtual Labs (VLs). VLs have provided numerous important benefits such as reduced costs, supported availability and accessibility, large scale observability, and increased safety. There is a significant number of studies that underline the potential of VLs for the enhancement of the educational process within classrooms. Despite the many benefits of VLs, there are still some disadvantages that need to be addressed. In this paper, we will discuss some current trends and challenges that are identified after a brief overview concerning VLs. We specify the kinds of labs that can be distinguished and present their characteristics. Some topics are considered and tried out. They also enable to present information in a more dynamic, compelling and interactive way with an engaging environment. A particular focus is to amalgamate ICT with other methods as an innovative practice to facilitate student-centered learning.

Keywords: Challenges, Innovative practices, Inclusive classroom, Virtual lab

GENERAL SURVEY ON REPRODUCTIVE BIOLOGY OF THREATENED ICTHYOFAUNA OF UPPER LAKE

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ABSTRACT

Researches on biological parameters are important to evaluate cultivation possibility of species of fishes. Sexual reproduction is one of the essential physiological systems that are very important in the living organism's life cycle consisting of fishes. The essential aim of the reproduction is to support the survival of the species, so fish have a trick and channels to reach this target. The reproductive actions are important to examine in condition to experience the population dynamics and spawning season of fish. The indicated details are much important in connection to the evolution of breeding technology for conservation and aquaculture. In comparison to females, the male showed earlier maturation. In both sexes male and female five gonadal maturity were identified are immature, maturing, mature, ripe and spent. The population is always being dominated by a female. The GSI of male and female increased per month and achieved its highest level in June. Fecundity increased in relation to total length, body weight, ovary length, ovary weight. Sex ratio gives primary knowledge to evaluates the biological potential and assess the population of fish stock.

Keywords: Sex ratio, Fecundity, GSI, Length-weight relationship, Fish species

GENERAL IMPACT OF ZOOPLANKTON ON THE WATER BODY OF UPPER LAKE

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ABSTRACT

Zooplankton and its composition were examined in upper lake Bhopal pre-monsoon, monsoon and post-monsoon season with the help of aquatic parameters. Entire of zooplankton were identified and established the dominant group in every season. The zooplankton biomass corresponded easily with water temperature and salinity. Zooplankton

organism exhibited a middle location in the food web of the water ecosystem. They do not barely make an essential part of the lentic group just also contribute noteworthy, the biotic production of the fresh water system. The significant of the zooplankton is completely acknowledge while these have essential part in the food chain and participate a key role in revolution of organic matter in the water ecosystem. In the current study, the total zooplankton frequency revealed a single peak value in the month of March. But an unexpected increase was observed during the month of October that resumed up to March. That indicated increase is assigned to the position of rainwater come back of beneficial condition in the post-monsoon season.

Keywords: Zooplanktons, Upper lake, Population dynamics, Season

SYNTHESIS, CHARACTERIZATION AND ANTIFUNGAL ACTIVITY OF TRANSITION METAL(II) COMPLEX OF SCHIFF BASE DERIVED FROM 2-AMINOTHIOPHENOL

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ABSTRACT

A new tridentate Schiff base has been synthesized from salicylaldehyde and 2-amino thiophenol in ethanol and treating with zinc chloride to form the metal complex. The synthesized compound has been characterized by several methods in particular; IR, CHN, ¹H NMR. On the basis of electronic absorption and magnetic susceptibility data six-coordinated geometry is assigned to the complexes. The synthesized complex was also exposed to various fungi to establish its bioactivity which shows significant results. Both the synthesized compounds are active against fungi but the metal complex has been found to be more active than ligand.

Keywords: 2-amino thiophenol, Salicylaldehyde, Tridentate, Schiff base, Metal complex

SYNTHESIS AND CHARACTERIZATION OF GLIMEPIRIDE-ZINC COMPLEX BY IR, UV, NMR, XRD, MASS AND SEM

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ABSTRACT

Glimepiride, urea is a third-generation hypoglycemic drug. The synthesis and characterization of Zinc complex with glimepiride (an oral anti-diabetic drug) have been studied. Analytical data agrees with the molecular formula [(C₂₄H₃₄N₄O₅S)₂Zn]. Metalcomplex of Zn(II) has been synthesized with an active Glimepiride drug. Formation of a new complex [(C₂₄H₃₄N₄O₅S)₂Zn] has been supported by elemental analysis, conductivity measurements and spectral studies including IR, UV, magnetic susceptibility, TGA, XRD and SEM studies. The molar conductance measurements of the complex in DMSO indicate that the complex is non-electrolytic in nature. Analytical data and stoichiometry suggest a ligand-metal ratio of 2:1 for Zn(II) complex. The linkage through amide-O-and sulphone-O-atom was further supported by the appearance of a band in the far IR region at 676 cm⁻¹ in Zinc glimepiride complex that may be assignable to ν_{M-O} frequency. On the basis of spectral studies, Zn(II) is proposed to have tetrahedral geometry for the complex.

Keywords: Metal Complex, Glimepiride (Anti-Diabetic Drug), Spectral, IR, UV, NMR, SEM

STRUCTURAL, SPECTRAL AND BIOLOGICAL STUDIES OF TRANSITION METAL COMPLEX OF N,N'BIS (SALICYLIDENE)-O-PHENYLENEDIAMINE SCHIFF BASE

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ABSTRACT

The metal complex with a tetradentate N,N'bis(salicylidene)-o-phenylenediamine Schiff base ligand obtained by condensation of o-phenylenediamine and salicylaldehyde was studied by different methods. The properties of the ligand and complex were characterized by elemental analysis, solubility in common solvents, molar conductivities, and ultraviolet (UV) and visible (VIS) spectroscopy. Spectroscopic measurements were used to confirm the octahedral geometry of the metal complex. The *in vitro* antibacterial activity of the complex, at their two different concentrations, was screened against four bacterial pathogens, namely, *K. pneumoniae*, *E. coli*, *B. cereus* and *S. aureus*. The complex showed better activity as compared to the parent compound.

Keywords: o-phenylenediamine, Salicylaldehyde, Schiff base, Molar conductivities, Metal complex, Antibacterial activity

INFLUENCE OF DRYING METHOD ON THE PHYTOCHEMICAL CONSTITUENTS OF *BRYOPHYLLUM PINNATUM* (LIFE PLANT)

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ABSTRACT

India is rich in its traditional knowledge about the use of medicinal plants in combating diseases and provided the basis for several synthetic drugs. Phytochemical processing of plant material is essentially crucial to optimize the concentration of known constituent and also to maintain their activities. *Bryophyllum pinnatum* (Crassulaceae) is a divine herb with multiple medicinal properties viz., immunomodulator, CNS depressant, anti-inflammatory, antiallergic, anti anaphylactic, antileishmanial, anti tumorous, antihistamine, antiviral, febrifuge, gastroprotective, immunosuppressive, insecticidal, muscle relaxant and sedative. In the present study, the effects of drying processes on phytochemical constituents of *Bryophyllum pinnatum* were examined. Three kinds of plant material were studied by sun-dried (SD), air-dried (AD), oven-dried (OD) and phytochemicals of the plant were assessed. Air-dried plant material displayed highest level of phytochemical constituents followed by sun-dried and oven-dried plant materials. The results showed that oven drying process was much faster than other drying methods but phytochemical constituents lost in that process. Based on the results obtained from the study, air dry is recommended to dry plants for potential application in the development of synthetic drug.

Keywords: *Bryophyllum pinnatum*, Phytochemical processing, Phytochemical constituents

CULTIVAR IDENTIFICATION AND GENETIC RELATIONSHIP AMONG SELECTED *CICER* CULTIVARS BY USING ISSR MARKERS

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ABSTRACT

The ISSR markers have been applied to determine the genetic diversity and relationships in a number of crop species. The present study was carried out to illustrate the utility of the ISSR approach in the determination of intra-and inter-

species genetic diversity and relationships among the accessions. Six dinucleotide, ten trinucleotide and four tetranucleotide primers together with their anchored repeat primers were evaluated for their potential use in the determination of genetic relationships in wild and cultivar chickpea. 20 ISSR primers were tested out of them 08 primer on an average produced 126 bands across 20 genotype, of which 64 were polymorphic accounting for 53.8%. The percentage polymorphism, as shown by these ISSR primer, range from 7.89% by primer (CCT)₆ to 100% by (TCC)₆ and (ACT)₆ primer, thus show abundant polymorphism. The dendrogram based on similarity coefficient was constructed using the unweighted pair group of arithmetic mean. Twenty accessions clustered into two distinct groups. The similarity coefficient values for the cultivated chickpea lines in this UPGMA dendrogram ranged between 0.60 and 1.00. Therefore, some of wild and Cultivar originating from a common genetic background showed closer genetic relationship.

Keywords: Chickpea, *Cicer*, Cultivar, ISSR, Polymorphism, UPGMA

TWO-COMPARTMENT MODEL OF NEURONAL CELLS FOR STUDYING CALCIUM DYNAMICS AND ACTION POTENTIAL BEHAVIOR

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ABSTRACT

Neuron is the fundamental unit of the nervous system. Its principle function is to transfer information in the form of electrical signals. The intracellular and extracellular fluid of neuron contains Na⁺, K⁺, Ca²⁺, and Cl⁻ ions, which varies in concentrations. This variation generates a potential difference, which is termed as the membrane potential. This membrane potential varies during electrical signal transmission and this variation is referred to as the action potential. Calcium plays an important role in diverse biological processes. In neurons, intracellular calcium regulates neurotransmitter release, membrane excitability and neuronal plasticity. The neurons have different transport systems to control intracellular calcium concentration by mediating inflow and outflow of calcium through them. Voltage-gated calcium channels (VGCCs) at the plasma membrane mediate influx of calcium into the cell. We construct a model to explain the behavior of the membrane potential and calcium concentration in neuronal cells. In this model, we have extended the Goldman-Hodgkin-Katz (GHK) model to include the VGCCs, and the after hyperpolarizations. The different sources and drains for cellular calcium are modeled using transport equations, with different pumps to account for transfer across the cell membrane and to intracellular calcium reserves. Our results are compared to experiments on neocortical pyramidal neurons, where the calcium concentration and membrane potential are simultaneously measured. The model reproduces key results including the dependence of calcium concentration on spike frequency and number. This model can serve as a starting point for developing more extended models for Spatio-temporal behavior of calcium transients in neurons and other electrically excitable cells.

Keywords: Signal transmission, Action potential, Voltage-gated channel, Goldman-Hodgkin-Katz (GHK), Hyperpolarization, Spike frequency

QSAR AND DOCKING STUDIES ON A SERIES OF ACYL (THIO) UREAS AND THIADIAZOLO [2,3-a] PYRIMIDINE DERIVATIVE AS POTENT NEURAMINIDASE

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ABSTRACT

A quantitative structure-activity relationship (QSAR) study has been made on a series of acyl (thio) ureas and thiadiazolo [2,3-a] pyrimidine derivatives as potent inhibitors of influenza virus enzyme, neuraminidase (NA). A multiple linear regression (MLR) analysis showed that the NA inhibition potency of the compounds was primarily governed by their molecular size and thus there can be dispersion interaction between the inhibitors and the enzyme.

Using MLR model, a few compounds estimated to have a higher potency than the compounds in the existing series of substituted acyl (thio) urea and thiadiazolo [2,3-a] pyrimidines were predicated. When a docking study was performed on these predicated compounds with the enzyme (PDB id: 1A4G), all the compounds were found to form several hydrogen bonds with the receptor as well as to have some hydrophobic interactions. The most active compound in the series was, however, found to have slightly different interactions and these different interactions were probably the reason for its best activity. However, all predicted compounds were also estimated to have a much higher potency than the FDA approved two compounds, zanamivir and oseltamivir.

Keywords: Quantitative structure-activity relationship (QSAR), neuraminidase inhibitors acyl (thio) ureas, Thiadiazolo [2,3-a] pyrimidine docking studies.

EFFECT OF LACTOBACILLUS SPECIES ISOLATED FROM DAIRY PRODUCTS ON STAPHYLOCOCCUS SPECIES

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ABSTRACT

Dairy products contain a wide variety of microorganisms. Most important among them is Lactobacillus. Lactobacillus is a Gram-positive; rod-shaped, Catalase-negative, non-spore Forming micro-organism. Lactobacillus has a wide variety of beneficiary effects. These bacteria have Anti-inflammatory, Anti-diabetic, Anti-cancer, and anti-obesity potential. These bacteria are also used as probiotics. Lactobacillus can also inhibit the growth of other harmful bacteria like *Staphylococcus aureus*. *S. aureus* is a pathogenic bacteria which attaches to the intestinal gut and produces toxins causing diarrhoea, vomiting, and other intestinal disorders

Lactobacillus produces many metabolites which include organic acids, hydrogen peroxide, diacetyl and bacteriocins that could be applied in various fields including pharmaceutical food industry, and agriculture. These metabolites produces an inhibitory effect on the growth of other microbes. This property of these metabolites produced from Lactobacillus can be utilized in providing immunity to these harmful bacteria. Because of this property, Lactobacillus can be used as a preservative of food.

Keywords: Lactobacillus, Gram-positive bacteria, *Staphylococcus aureus*, Food preservation

DIAZO LINKAGE BASED SCHIFF BASE: SYNTHESIS, CHARACTERIZATION AND THEIR BIOLOGICAL APPLICATIONS

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ABSTRACT

The chemistry of compounds possessing Schiff base moiety and Diazo moiety has been an interesting field of research since long time. 4-aminoacetophenone was taken with thiourea which gives 4-(4-amino)phenyl-2-aminothiazole, which on reaction with sodium nitrite give its diazo salt. 4-(4-amino)phenyl-2-aminothiazole is then reacted with its diazo salt to obtain bis-thiazole. Diazo linkage containing bis-thiazole derivative 4-(4-amino-phenyl)-5-[4(4-amino)-thiazol-2-ylazo]-thiazole-2-ylamine, is further condensed with's aromatic aldehydes and ketones which gives a series of newly synthesized Schiff base. Synthesized derivatives of Schiff base are characterized by the physo chemical, physiological and IR. All synthesized compounds are screened for their antibacterial and antifungal activity by using the agar well diffusion method. The results revealed that the compound IIA, IIB and IID show excellent activity against *E. coli* and moderate show against *P. aeruginosa* and *S. aureus*. Compound IIB, IIE and IIF are show excellent against *S. aureus*. All compounds show moderate antifungal activity against *A. flavus* and *A. fumigates* and show excellent against *Candida albicans*.

Keywords: Thiazole, Schiff base, Diazo, Azomethine linkages and Biological applications

TLC PROFILING OF VARIOUS EXTRACTS OF *NELUMBO NUCIFERA*

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ABSTRACT

Nelumbo nucifera belongs to family *Nelumbonaceae*. The plant has various ethnomedicinal importance as used to treat leucoderma, smallpox, dysentery, vomiting, leprosy, skin diseases and various other diseases. Preliminary Phytochemical screening performed in petroleum ether, chloroform, ethyl acetate, ethanol and aqueous extracts of *nelumbo nucifera* flower confirmed the presence of various phytoconstituents such as alkaloids, phenols, flavonoids etc. in various extracts of *Nelumbo nucifera* flower. Most of the phytochemicals were found mainly in ethyl acetate, ethanolic and aqueous extracts. TLC was performed in these three extracts for the determination of phenolic and flavonoid constituents. From the study, it is found that Flavonoid showed its presence in all three extracts while phenolic constituents were found only in ethanolic and ethyl acetate extract. These findings suggested that *Nelumbo nucifera* could be the potential source of drugs which in the future may serve for the production of synthetically improved therapeutic agents.

Keywords: *Nelumbo nucifera*, Ethnomedicinal importance, Phytochemical screening, TLC

A STUDIES ON AIR POLLUTION TOLERANCE INDEX (APTI) AND ANTICIPATED PERFORMANCE INDEX (API) OF SOME PLANTS

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ABSTRACT

Due to industrialization, urbanization and the increasing number of vehicles air pollution have turn out to be a serious problem today. Nowadays particulate matter shows the undesirable effects on plants, animals and human beings also. Tree plantation program is the best ways to control the air pollution. Most of the plants filter the air by their aerial elements. Vegetation naturally cleanses the atmosphere by absorbing gases and some particulate matters through leaves so they works as sink for air pollution and reduce pollution level in the atmosphere. Leaves function as an efficient pollutant trapping device. Air pollution can directly affects plants via leaves or indirectly via soil acidification. Air pollution tolerance index (APTI) is an intrinsic quality of trees to control air pollution problems. The tree's higher tolerance index are tolerance towards air pollution and can be used as a source to control air pollution. Air pollution tolerance index can be used as an indicator of the rate of air pollution. By combining biochemical and aggregate factors the anticipated performance index (API) is prepared which is used as the development of a green belt. Thus, the assessment of APTI and API potential of different trees are used to control air pollution.

Keywords: Urbanization, Particulate matter, Aerial elements, Sink, Trapping device, Indicator, Green belt

COMMON FIXED-POINT THEOREM IN G-MATRIC SPACE

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ABSTRACT

In this paper, the common fixed-point theorem on G-Metric Space is proved using EA-Property. The obtained result generalized many well-known results in fixed point theory concerning with metric spaces.

Keywords: Fixed Point, Common Fixed Point, G-metric space, EA Property

ANTIMICROBIAL ACTIVITY OF TINOSPORA CRISPA LEAF EXTRACT

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ABSTRACT

The aim of this study was to determine the *in vitro* antimicrobial activity of hydroalcoholic extract of leaves of *Tinospora crispa*. Antimicrobial activity was examined by a well diffusion method against gram-positive bacterial strains of *Staphylococcus Aureus*, *S. Mutant*, *Bacillus Subtillus*, Gram Negative bacterial strains of *E. coli*, *Salmonella bongori*, *Klebsilla Pnemoniae*, Fungus strains *Aspergillus Niger*, *Aspergillus Flavus*, *Candida Albicans*. The maximum zone of Inhibition was obtained with distilled water extract. The highest potential was observed in the hydroalcoholic extract of *Tinospora crispa* against *Salmonella bongori*, *Klebsilla Pnemoniae*. The results confirm that *Tinospora crispa* can be used as a source of drugs to fight infections caused by susceptible bacteria.

Keywords: *Tinospora crispa*, Leaf crude extract, Antimicrobial activity, Well diffusion method

ACTINOMYCETES: ROLE IN PLANT GROWTH PROMOTION AND BIOLOGICAL CONTROL

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ABSTRACT

Plant growth-promoting rhizobacteria (PGPR) can be used in a variety of ways when plant growth enhancements are required and are extensively used in agriculture and horticulture. Currently, many PGPR formulations are used as commercial products for agricultural production. Plant growth-promoting rhizobacteria use various direct or indirect mechanisms to influence plant growth. The role of actinomycetes in the plant growth-promoting activities like siderophore production, indole acetic acid (IAA) production, P-solubilization and biocontrol activity against various plant pathogens have been very well documented. Endophytic actinomycetes have been isolated from live tissues of various plant species. Endophytic actinomycetes have been shown to protect plants against different soilborne plant pathogens like *Rhizoctonia solani*, *Verticillium dahlia*, *Fusarium sp.*, *Sclerotinia sclerotiorum* etc. Actinomycetes are one of the most abundant group of soil microorganisms and very well identified for their antibiotics production to control the fungal pathogens. Due to production of various enzymes and antibiotics they are well studied for biological control and plant growth promotion. Owing to their great diversity in enzyme production, actinomycetes are used extensively in the pharmaceutical industry and agriculture.

Keywords: Actinomycetes, PGPR, Biocontrol

EXPLORING ROLE OF STEEL COMPOSITE BUILDINGS TO MEET TARGETS OF PRADHAN MANTRI AWAS YOJANA

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ABSTRACT

Indian government's initiative 'Housing for all by 2022' is very ambitious considering the state of the art in constructional practices particularly in housing sector. To achieve set target of construction of about 20 million urban and 40 million rural residential units a paradigm shift is needed in the way in which the housing construction operations are currently carried out. The situation is currently more alarming given the unmet demand of delivering completed houses in time which calls for adopting a constructional system that is faster and satisfy desired structural

and aesthetical requirements. The initial stage of the planning and design involve critical decision regarding the selection of the construction material and technology which is important as it influence the quality of construction, construction time and cost. This research put forth various issues typically involves choosing steel against reinforced concrete which is currently the default option for the construction in Indian housing sector. It has been argued that the use of steel composite buildings can rapidly deliver housing satisfying stringent environmental, quality and economic standards. Analysis indicated the suitability of this system in light of the time available to achieve the target of providing housing units within the time available in hand.

Keywords: Pradhan Mantri, Gauge, Cold form, Awas

ARTIFICIAL SWEETENER BOON OR CURSE: A BRIEF REVIEW

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ABSTRACT

Artificial Sweeteners are the food additive that provides a sweet taste and containing significantly less energy, derived through plant extracts or processed by chemical synthesis. These are either incompletely metabolized or aren't metabolized by our bodies because our bodies don't have the enzymes needed to digest them.

Effect of Artificial Sweeteners on health

1. Recent studies have found that replacing sugar with artificially sweetener, may reduce hunger and calorie intake, so these may help to lose weight.
2. These may disrupt the balance of gut bacteria, which could increase the risk of many chronic diseases.
3. They do not erode teeth as they are not fermented by the microflora of the dental plaque.
4. These are unlikely to cause headaches, depression, or seizures.
5. Diabetics, have difficulty in regulating their blood sugar levels and need to limit their sugar intake. artificial sweeteners allow sweet-tasting food without increasing blood glucose. A concern, however, is that overconsumption of foods and beverages made more appealing with sugar substitutes may increase the risk of developing diabetes.
6. Many sugar substitutes are cheaper than sugar because of their long shelf-life and high sweetening intensity.

Conclusion: Artificial sweeteners are often the topic of heated debate: overall, the use of artificial sweeteners poses few risks like cancer, harm blood glucose level, gut disruption and may even have benefits for weight loss, blood sugar control, and dental health, the likelihood of negative effects can vary by individual and depend on the type of artificial sweetener consumed.

Sweeteners are safe to use: Utilize all-natural sugars, these include agave syrup, honey, maple syrup, monk fruit, Stevia. These sugars are made by nature not in a lab and do not undergo the high chemical processing of artificial sweeteners. For optimal nutrition levels, sugars should be used in moderation.

Keywords: Artificial sweeteners, Health, Metabolism

NURTURING SCIENTIFIC LITERACY USING SOCIO SCIENTIFIC ISSUES: A PEDAGOGICAL APPROACH

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ABSTRACT

In the present century, science has entered into every sphere of life. Regardless of the industrialization in societies, it is important to create a citizen who is scientifically literate. It is also important that all the people whatever be the level of

their formal education should have the opportunity to acquire a bit of scientific knowledge and understanding. The meaning of scientific literacy has moved from narrow accurate meaning, of ability to understand scientific literature to a much wider concept which has at its core the idea of science for effective citizenship. National curriculum framework-2005 by NCERT states that science is a dynamic, expanding body of knowledge covering every new domains of experiences. It is also said that science is a social effort and it works towards benefits of the society. Scientific literacy is one of the major goals of science education, which includes an understanding of the basic science concepts, utilizing science process skills, making meaningful connections of science, technology and society, developing values and attitudes toward science and knowing the nature of science. NRC (1996) defined scientific literacy as “the knowledge and understanding of scientific concepts and processes required for personal decision making, participation in civic and cultural affairs, and economic productivity” (p.22). Socioscientific issues in science education gives students inimitable prospects to challenge student’s moral reasoning and, in this process, presents concepts that makes meaning because of its relevance and student’s interest. A Socioscientific issue is the functional part of scientific literacy. Discussing socioscientific issues in the classroom teaching learning process will initiate rational thinking among students, which will cover a range of knowledge and skill including, understanding of the effect of science and technology in daily life helping students to build positive attitudes towards the use of scientific knowledge, questioning scientifically and inferencing based on evidences. Thus during the teaching-learning process, the teacher initiates socioscientific issues in the classroom by using appropriate scientific content which are embeded in the scientific and social context thus developing scientific literacy among students. This paper will try to examine the practice, context, incidences and issues related to socioscientific issues which will nurture scientific literacy among students.

Keywords: NCERT, Scientific literacy, Socioscientific issues

LEAD TOXICITY AND ITS ADVERSE EFFECTS ON HUMAN HEALTH (REVIEW ARTICLE) NEELESH AGRAWAL RESEARCH SCHOLAR IN THE DEPARTMENT OF CHEMISTRY

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ABSTRACT

Lead toxicity is one of the most hazardous metal toxicities. It can enter the body through lead-based paint, dust, water, soil, tableware, and folk medicines. Environmental lead exposure is a global health concern in children. Acute or chronic lead exposure may cause reversible or even permanent damages in human beings. Occupational lead poisoning is still a health issue, particularly in developing countries. The majority of cases of lead poisoning are due to oral ingestion and absorption through the gut. Lead poisoning in adults occurs more frequently during exposure in the workplace and primarily involves the central nervous system. Lead is highly persistent in the environment and because of its continuous use, its levels rise in almost every country, posing serious threats. Lead toxicity also affects neurotransmitter levels and causes severe health issues related to organ damage, some even leading to death. Lead poisoning is preventable. This includes individual efforts such as removing lead-containing items from the home, workplace efforts such as improved ventilation and monitoring, and nationwide policies such as laws that ban lead in products such as paint and gasoline, reduce allowable levels in water or soil, and provide for cleaning of contaminated soil. The major treatments are removal of the source of lead and the use of medications that bind lead so it can be eliminated from the body, known as chelation therapy. The main aim of this review article is to summarize lead toxicity detection, its sources, and its mechanism including various toxicological effects on human health.

Keywords: Lead toxicity, Lead exposure, Chelation therapy, Human health

HEAVY METAL POLLUTION AND THEIR TOXIC EFFECTS ON FRESHWATER FISH

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ABSTRACT

Heavy metals are specifically important due to their toxicity and ability to bioaccumulate in aquatic biomes. Heavy metals tend to accumulate in the aquatic environment because they cannot be degraded. Ultimately, this leads to human exposure and results in serious environmental problems. The concentrations of heavy metals in freshwater

fishes will help us to understand the risks of heavy metals contamination on human health. Thus, we will be able to establish practical and cost-effective remediations for this environmental and public health problem.

Keywords: Heavy metals, Pollution, Freshwater fish, Toxicity

DETERMINATION OF HEAVY METALS IN FRESHWATER FISHES

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ABSTRACT

Accumulation patterns are more in some fish species than others because of the ability of fish to bioaccumulate metals. Heavy metals in fish come mainly from their diet, and levels of bioaccumulation of contaminants are higher in fish which comes higher in the food chain. In this study, the levels of five heavy metals i.e. zinc, nickel, cadmium, lead and chromium has been determined from the fishes, sediments and water. Heavy metals concentrate in water and entered into the food chain. The patterns of bioaccumulation of heavy metals are determined by the absorbance and excretion rates of fish.

Keywords: Heavymetals, Pollution freshwater fishes, Toxicity

COMPARATIVE STUDY OF CLASSICAL AND QUANTUM THEORY OF SPECIFIC HEAT OF SOLID

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M. Sc. (Physics)

ABSTRACT

The present study talks about the concept of specific heat of solid and variations in its value with temperature. It comprises classical approach of Dulong and petit, it's success and limitations; Einstein' Quantum theory, it's success and limitations; finally, it talks about the Debye's theory in which concept o Highest frequency is introduced where Debye considered the modes of vibration of entire crystal and Debye temperature.

Keywords: Specific heat, Modes of vibration Debye's temperature

EMPLOYMENT OF HYDROTROPIC AND MIXED HYDROTROPIC SOLUTIONS AS MOBILE PHASE TO CARRY OUT TLC PRECLUDING THE USE OF ORGANIC SOLVENTS

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ABSTRACT

A large number of organic solvents, viz. butanol, acetic acid, hexane, acetone, chloroform, ether, ethyl acetate, ethanol, toluene, dichloromethane, xylene, heptane, and cyclohexane are employed to perform thin-layer chromatography (TLC) of various drugs. Most of these organic solvents are costly and hazardous to health. Some organic solvents have been reported to be carcinogenic. To a certain extent, such solvents are responsible for environmental pollution also. Also, their disposal requires stringent procedures which makes the process both costly and typical. In the present investigation, hydrotropic and mixed hydrotropic solutions were employed as a mobile phase to perform TLC of some drugs precluding the use of organic solvents. Propanolol, Guaifenesin, Ciprofloxacin, Pyridoxine hydrochloride, Lidocaine hydrochloride, Thiamine hydrochloride, Metformin hydrochloride, Piperazine citrate and Losartan potassium were selected as model drugs. Sodium benzoate, sodium citrate, sodium acetate, and niacinamide in various combinations were employed as model hydrotropic agents. In the case of the proposed methods, solutions of the

above listed hydrotropic agents in distilled water in different concentrations were employed as mobile phases to perform TLC of the selected drugs. The observed Rf values in the case of proposed methods ranged from 0.33 to 0.84. As per the mixed solvency concept, solids also possess solubilizing properties. In mixed hydrotropy, the composition of blends containing various hydrotropic agents can be varied in such a way that proper Rf value of drug spot is resulted without tailing effect. The proposed TLC methods are new, simple, cost-effective, environment-friendly, and safe. In the future, hydrotropic solutions shall prove a boon in TLC and high-performance thin-layer chromatography (HPTLC) analysis of a vast number of drugs discouraging the use of organic solvents to a great extent.

Keywords: Organic solvents, Thin layer chromatography, Mixed solvency concept, Hydrotropy, Mixed hydrotropy

VARIATION OF GPS DERIVED TOTAL ELECTRON CONTENT AND SCINTILLATION INDEX OVER INDIAN, ARCTIC AND ANTARCTIC STATIONS, 2008

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ABSTRACT

The conduct of polar ionosphere is altogether not quite the same as the tropical and low scope ionosphere it is because of overwhelmed by high geomagnetic action and gets a completely unique radiation spending plan. The behavior of Total Electron Content and Amplitude Scintillation Index has been studied over the Indian polar stations Himadari (78.9 °N Lat. and 11.9 °E Long.) and Maitri (70.650 N Lat, 11.450 E Long) during the low solar activity period, January to December, 2008. The outcomes are introduced here, for the Arctic station the study has been performed only for the month of October and November due to non-availability of data for other months, while for Antarctic station, the study has been carried out monthly as well as seasonally. From the analysis, we observed that TEC achieves its highest values during the months of January and December as compared to June month in contrast to equatorial or low latitude TEC, because during these months (Polar days) the polar cap receives the solar radiation round the clock, in the month of June lowest value of TEC was recorded due to absence of solar radiation during this month (Polar night). The seasonal study showed that during the winter season the values of TEC remain low due to low ionization and during summer season the values of TEC achieve the highest values which are contrary to equatorial and low latitude ionosphere. The high latitude L-band scintillation was also studied during this period 2008. The observations reveal that the high latitude L-band scintillations were generally weak type (S4 index less than 0.5) since this period experienced low solar activity conditions. Season wise, their maximum percentage occurrence is observed in winter season i.e. polar night periods from May to August 2008 as compared to summer and equinox seasons.

Keywords: Ionosphere, Polar Region, TEC, Scintillation

CHEMICAL METHOD OF E-WASTE MANAGEMENT-A STRONGEST SPOKE OF GROWTH WHEEL OF INDIA

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ABSTRACT

India has developed as the fastest developing significant economy in the world and is required to be one of the main three economic powers of the world in the next 10-15 y, backed by its strong majority rules system and its partnerships. India's nominal GDP growth rate is also appreciable as a comparison to other developing nations. During the second quarter of 2019-20, GDP stood at Rs 33.16 lakh crore (US\$ 474.46 billion) depicting a sustainable growth at a rate of 4.3 percent over the same quarter of the previous year. Along with the economic growth of the nation, managing E-waste is also necessary, which are discarded surplus, obsolete, broken electronic equipment. In India,

most of the waste electronic items are stored at households as normal citizens do not aware of discarding methods of them. This will result into the increase in waste is very complicated and is also a high source of metals such as gold, silver, and copper, which can be recycled and brought back into the productive use, which also employ several categories of people in India, out of all other methods, chemical method which include ion-exchange approach, precipitation approach, oxidation approach, reduction approach, and neutralization approaches are appropriate to manage E-waste in India. So this research paper identifies the suitability of the chemical method for E-Waste management, which will result in the growth of India.

Keywords: Sustainable Growth, Electronic Waste Management, Discarding, Chemical Method

DIRECT ORGANOCATALYTIC WITTING/HETERO- DIELS-ALDER REACTION IN ONE POT: SYNTHESIS OF HIGHLY-SUBSTITUTED TETRAHYDROPYRANONES

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ABSTRACT

A practical and environmentally friendly organocatalytic one-pot strategy designed to furnish the Hetero-Diels-Alder product was shown to be effective in the preparation of disubstituted tetrahydropyranones in a highly selective manner.

(S)-1-(2-pyrrolidinylmethyl)pyrrolidine catalysed an asymmetric assembly reaction involving a Hetero-Diels-Alder reaction between alkylidene and arylidene-acetones generated *in situ* from Wittig reaction with diethyl ketomalonate to furnish the substituted tetrahydropyranones in moderate to very good yield with moderate enantioselectivity.

Keywords: Aminoacids, Diethyl ketomalonate, Hetero-Diels-Alder reaction, Multicomponent reaction, Organocatalysis

जलवायु परिवर्तन प्राकृतिक आयाम एवं मानवीय क्रियायें

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ABSTRACT

पृथ्वी के भौगोलिक इतिहास में जलवायु परिवर्तन एक क्रमिक एवं प्राचीन परिघटना है। पृथ्वी की उत्पत्ति (लगभग 6.5 अरब वर्ष पूर्व) से लेकर अब तक पृथ्वी पर कई हिमयुग और उनके बीच अन्तर्हिमयुग आये हैं। अर्थात् चक्रिय रूप से जलवायु कभी ठण्डी तो कभी गर्म हुई है। मिलानकोविच के अनुसार के पृथ्वी के अक्षीय झुकाव, पृथ्वी की कक्षा के पूर्ववर्तीपन में विभिन्नता के कारण पृथ्वी पर पहुंचने वाले सौर्यिक विकिरण में भी चक्रिय भिन्नता आती है, जो पृथ्वी पर जलवायु पैटर्न को मजबूती से प्रभावित करती है। वर्तमान में मानव की भौतिक एवं आर्थिक क्रियायें भी जलवायु को परिवर्तित कर रही हैं, मानव इन गतिविधियों के कारण न केवल जलवायु परिवर्तन हो रहा है बल्कि इसकी तीव्रता भी मिलानकोविच चक्र की तुलना में कई गुना ज्यादा है।

प्रस्तुत शोध पत्र का उद्देश्य 21 वीं शताब्दी में जलवायु परिवर्तन में प्राकृतिक आयामों एवं मानवीय आर्थिक, भौतिक क्रियाओं द्वारा होने वाले नकारात्मक प्रभावों का विश्लेषण करना तथा विश्व स्तर पर जलवायु परिवर्तनों को रोकने हेतु किए जाने वाले प्रयासों का विश्लेषण करना है।

Keywords: जलवायु परिवर्तन, प्राकृतिक आयाम, मिलानकोविच चक्र, सौर्यिक विकिरण, हिमयुग, अन्तर्हिमयुग।

COMPARISON OF DAY TO DAY VARIABILITY AT LOW, MID AND HIGH LATITUDE DURING 24 SOLAR CYCLE

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ABSTRACT

This paper present the analysis of the F region variability of ionosphere during the Low solar activity period year 2009 for three stations of low, mid and high latitude Chongqing (29.43°N, 106.92°E), Beijing (39.91°N, 116.41°E) and sodankyla (67.40°N, 26.59°E) respectively. We discuss the diurnal, seasonal, and monthly variability of foF₂. We observed that during the month of November sodankyla and Beijing shows maximum variation of foF₂ and Chongqing shows the maximum variation of foF₂ in month of March.

Keywords: Ionosphere, foF₂ (Critical frequency of F₂ layer), Day to day variability, Seasonal variation