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Book of Abstracts

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Convolution Neural Network Based Approach for Diabetic Retinopathy Detection using Fundus Images

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Diabetic Retinopathy (DR) is the most common diabetic condition that affects the retina and is the primary cause of blindness worldwide. Patients' eyesight preservation depends critically on timely discovery, although early diagnosis is still difficult and mostly depends on the interpretation of fundus pictures by clinical professionals. A proprietary dataset was used in this study's training and validation of a deep learning model. Test picture quality was evaluated by the intelligent model, which classified the photos into DR-Positive and DR-Negative groups and further classified the images into mild, moderate, severe, and normal severity stages. The model's performance will next be closely examined by an expert assessment, taking into account the acquired outcomes.

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Cricket Augmented Reality Training Application (C.A.R.T.A.)

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Cricket Augmented Reality Training Application (C.A.R.T.A.) is an augmented reality training-based application which can help its users to face and experience actual events happening in real time. C.A.R.T.A. in its early stages provides its services to the gentleman's game "Cricket"that too at the ground level.

When a batter and the bowler trains in the nets one-on-one they try to create scenarios such as field positioning, targets, situations etc. which will help them get ready for the tough times out there in the field and to build strategies. A lot of confusion happens during these training sessions where the bowler tells the batter about a field and the batter plays a shot according to it but cannot get a conclusion if they played according to the bowler's field or not, which causes a conflict and also a problem in the process. To ease these training situations C.A.R.T.A. will play a big role. C.A.R.T.A. will provide the bowler with the application on their phones where they can set the field and create the scenarios according to which they want to train and the batter will have the AR goggles which will show him the fields and situations put up against him/her by the bowler. At the same time the bowler will get their own bowling analysis on their phone live tracking of his/her performance. This will help both the sides in analyzing their performances during the training session.

C.A.R.T.A. will be using AI techniques like SLAM (Simultaneous Localization and Mapping), Computer Vision, Optical Projection Systems etc. for the above problem to be solved. The main aim of this paper is to make C.A.R.T.A. come to life and make the lives of the local professional cricketers easy.

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Recommendation System for Short Videos: An Over View

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In this project we would go through Recommendation System for Short Videos. Many modern web-based platforms is to maximize business KPIs or user pleasure by presenting users with sorted lists of recommendations. Users of social media have been spending a lot of time on Short Form Video (SFV) platforms in recent years. Promising solutions for tailored content recommendation have emerged in response to the rapid advancements in machine intelligence. In order to mitigate the semantic gap when recommending videos based solely on visual characteristics, video recommendation has become increasingly important. various methods that help the created applications to recommend SFV. We pre-process the videos to remove any observed noise, passing the videos through various algorithms like motion adaptive gaussian denoising filtering, visual features extraction and content-based filtering, Monte-Carlo Sampling method. EmoWare helps in capturing the emotion of the user and recommend videos or short videos accordingly - works based on the study of the emotion and scaling the factors like joy, surprise, lip stretch etc scaling from 1 to 100. This involves integrating bidirectional RNN and Reinforcement learning (RL) for context-ware sequence learning, along with continuous emotional annotation, implicit feedback mechanism and dynamic mood-based recommendation with emotional intensity filtering. Unlike traditional platforms, users keep scrolling instead of stopping at individual posts. Existing models based on user position in the feed or past interactions aren't effective. Positional model proposes a new model that considers users having a "scrolling budget" - a limited amount of scrolling they're willing to do. This budget follows a specific pattern, and the model uses it to estimate how likely users are to see specific content in the feed. This approach is claimed to be more accurate than existing methods and could improve recommendation systems for these platforms. The inability of legacy bitrate adaption algorithms to distinguish between the weights of videos in the list based on user choices results in the waste of bandwidth when downloading videos that consumers quickly skip without being displayed. RecDASH, a bitrate adaptation approach, is utilized to get around this issue.

Keywords: Short-Video recommendation, Positional bias, Legacy Bitrate, Multitask Ranking System, EmoWare.

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Essential Oils and Their Role in Sustainable Cotton Pest Management

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Cotton, referred to as "White-Gold,"is a significant commercial crop in India, accounting for approximately 25% of the world's cotton production. It thrives in hot, sunny, and rain-fed environments. The cotton plant's parts, such as the soft lint and cottonseed, are extensively utilized in the textile industry and as animal feed. India is the second-largest producer of cotton globally. The cultivation of cotton directly supports 6 million farmers and indirectly provides employment to 40-50 million people in related sectors. However, the crop is vulnerable to various pests, with the Pink Bollworm (Pectinophora gossypiella) being the most notable. The Pink Bollworm threatens cotton crops worldwide by damaging the fibers and reducing the overall yield and quality of fiber. Previous studies have explored the use of pheromones as an eco-friendly method to control these infestations.

These pheromones interfere with mating and hinder population growth, providing a sustainable control that reduces reliance on conventional insecticides. However, the effectiveness of these studies has been limited, indicating the need to explore alternative eco-friendly strategies. The proposed research will investigate the composition, combinations, and ratios of various essential oils to determine their effectiveness against crop-infecting insects as next-generation pesticides. These oils, which are complex mixtures of bioactive compounds derived from aromatic and other plant species, were selected after a thorough literature review. It has been ensured that their use complies with the guidelines set by the Environmental Protection Agency (EPA). A combination of essential oils, and their effect on the growth and repellant activity of selected insects, will help us to develop an effective solution against major pests affecting cotton crop. The findings of this study will contribute to the development of innovative pest management strategies for sustainable agriculture, marking a significant stride towards eco-friendly farming practices.

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Characterisation studies of mucus obtained from Pangasianodon hypopthalamus for its therapeutic potential

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Therapeutic properties of fishes are known since immemorial because of the presence of various fatty acids in it. Docosahexaenoic acid(DHA) and Oleic acid is a fatty acid that is known for curing heart and inflammation related diseases. Fish mucus is known to have antimicrobial, anti-inflammatory and wound healing potency. In this regard our study aims to characterize the lyophilized fish mucus of Pangasianodon hypopthalamus and evaluate its therapeutic potential. FTIR, NMR, GCMS analysis and docking studies was performed for analysis. FTIR results showed the presence of nitro and alcoholic groups. NMR spectral analysis showed the presence of alcohol, amine and alkene groups. CGMS analysis results showed the presence of oleic acid constituting 45% of peak area followed by Eicosane and many more. Further docking was performed to check for the binding capacity of Oleic acid against selected targets like TNF-α, VEGF, IL6, NF-kB, TP53 to evaluate anti-inflammatory and wound healing, The results showed that, there was presence of hydrogen bonds found between the ligand and target except IL6, thus regulating the genes in the presence of Oleic acid. Further gene expression studies and invivo has to be performed for discovery of potential drug.

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Optimizing Speech and Language Therapy for Children with Autism Using AI and Prosodic Pattern Analysis

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Speech and language impairments are common among children with autism spectrum disorder (ASD), often manifesting as difficulties with articulation, prosody, and social communication. Traditional speech and language therapy is effective but tends to follow standardized approaches that may not fully account for the unique and evolving needs of each child. This research aims to develop an AI driven platform that customizes speech and language therapy for children with ASD by analyzing individual speech patterns, prosodic features, and social communication behaviors.
The proposed platform integrates advanced machine learning models, such as natural language processing (NLP) and speech recognition, to assess and track a child's speech progress over time. By continuously monitoring features like pitch, rhythm, intonation, and volume (prosody), as well as verbal

and non-verbal communication cues, the platform generates personalized therapy recommendations tailored to the child's specific linguistic and communicative challenges. The system is designed to adapt dynamically, updating its recommendations based on ongoing analysis of real-time data collected during therapy sessions or daily interactions.
A key feature of the platform is its ability to analyze social communication behaviors, such as turn-taking, eye contact, and the use of gestures, to identify areas where additional support may be needed. The AI model learns from each interaction, adjusting its recommendations for therapy exercises, visual and auditory stimuli, and communication prompts based on the child's progress and response patterns.
In an initial evaluation, the platform was implemented with a group of children diagnosed with ASD, yielding promising results. The system demonstrated its ability to adapt to the individual needs of each child, providing personalized feedback and tailored therapy exercises. Participants exhibited progress in various areas, such as clearer speech patterns, improved control over vocal modulation, and enhanced social interaction skills. Additionally, the platform offered therapists valuable real time insights into each child's communication behaviors, allowing for more informed and responsive intervention strategies. The system's continuous learning and adjustment capabilities made it an effective tool for enhancing both the quality and precision of speech therapy interventions.
The research highlights the potential of AI in revolutionizing speech and language therapy for children with ASD, offering a highly personalized, scalable, and flexible solution that evolves with the child's unique developmental needs.

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Real Time Adaptation of Reading Materials for Dyslexic Students Using Natural Language Processing.

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Dyslexia, a specific learning disability characterized by difficulties in reading and language processing, poses significant challenges in conventional educational settings. Traditional remedial approaches often lack the adaptability required to address the diverse needs of dyslexic students effectively. This research paper presents the development and evaluation of a novel machine learning (ML) framework designed to dynamically adapt reading materials and exercises based on individual dyslexia profiles. The proposed framework utilizes advanced ML algorithms, including natural language processing (NLP) and adaptive learning techniques, to create a personalized educational experience for each student.
The core of the research involves designing ML algorithms that analyze a range of data points, such as reading speed, error patterns, and comprehension levels, to tailor educational content in real-time. By continuously assessing these parameters, the system adjusts the complexity, format, and delivery of reading materials and exercises to better align with the unique needs of each student. This real-time adaptability aims to address specific reading challenges faced by dyslexic students, thereby enhancing their learning experience and improving overall academic performance.
The research methodology includes the development of a prototype system, followed by a series of experiments to evaluate its effectiveness. The evaluation process involves testing the system with a cohort of dyslexic students, measuring its impact on reading fluency, comprehension, and engagement compared to traditional methods. Results are analyzed to determine the system's efficacy in providing meaningful and individualized support.
The findings from this research are anticipated to offer significant contributions to the fields of educational technology and special education. By demonstrating the potential of ML-driven adaptive learning systems, the study highlights a promising approach to supporting dyslexic students through personalized, data-driven interventions. The implications extend to broader applications in educational settings, offering a scalable solution for enhancing learning outcomes among students with diverse learning needs.

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Inhibition of Autoinducing Peptides by Lactic Acid Bacteria: A Promising Strategy Against Enterococcus faecalis from saliva

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Novel therapeutic strategies are required to mitigate antibiotic-resistant Enterococcus faecalis, a common pathogen in oral infections. In current work, we investigated the possibility of lactic acid bacterial (LAB) solvent extracts to suppress autoinducing peptides (AIPs), which are essential for quorum sensing in E. faecalis. E. faecalis isolates were characterized from saliva. The capacity of LAB extracts can obstruct AIP-mediated quorum sensing that in turn lowered the expression of virulence factors and the formation of biofilms. These results demonstrate the potentiality of LAB extracts as natural alternatives to conventional antibiotics by blocking quorum sensing in E. faecalis. Additional research into these extracts' active ingredients and their mechanisms of action may result in novel therapeutic agents.

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Sustainable Synthesis of Schiff Base Ligand involving Green Technology

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This research underscores sustainability through the implementation of environmental friendly synthesis of Schiff Base, leveraging the well-established versatility and pharmacological effects of the ligand. Citric acid, sourced from citrus fruits, replaces conventional laboratory acids, fostering an eco-friendly acidic environment for catalytic activity. Microwave irradiation, for 4 to 5 minutes, accelerates the reaction, minimizing harmful chemical emissions compared to traditional reflux processes. Structural prediction, comprehensive analysis of anti-bacterial studies unveils significant interactions of the ligands. This holistic approach aligns with sustainable practices and advances the understanding of environmentally conscious synthesis methodologies.

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Biofuel Properties Analysis of the Combination of Transesterified Lipids Derived from Pseudomonas Aeruginosa and Seeds of Pongamia Pinnata

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This study investigates the potential of *Pseudomonas aeruginosa* as a candidate for biodiesel production through the analysis of fatty acid methyl esters (FAMEs) obtained from microbial lipid extraction and transesterification in comparison to that of leaves of *Pongamia pinnata.* Solvent-mediated lipid extraction in *Pseudomonas aeruginosa* and *Pongamia pinnata* was compared, revealing significantly higher lipid yield in the bacteria. Gas chromatography-mass spectrometry (GC-MS) analysis revealed the presence of predominant FAMEs, suggesting the capability of *Pseudomonas aeruginosa* to produce a diverse range of fatty acid derivatives suitable for biodiesel synthesis. Additionally, the analysis of biofuel properties demonstrated that the combined lipid composition extracted from *Pongamia pinnata* seeds and *Pseudomonas aeruginosa* meets biodiesel standards.

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Characterization and Antibiotic Susceptibility Profile of Bacteria Isolated from Seafoods Sold in Coastal Cities of India

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Seafoods are highly perishable commodities as they deteriorate faster due to bacteria occurring naturally in marine environment. This limits the shelf life of the seafoods which may eventually become unfit and unsafe for human consumption. The present study was aimed at isolation and characterization of bacteria from fresh seafoods along with determination of antibiotic susceptibility profile. Ninety samples of seafishes comprising of Indian Sardine (Sardinella longiceps) and Indian anchovy (Stolephorus indicus) sold in three different forms were collected from the seacoasts of Chennai, Cochin, Kanyakumari, Mangalore and Tuticorin.The samples were transported in sterile saline bags and kept refrigerated until further processing. Ten gram of each sample was homogenized and bacterial enumeration was done using plate count agar. Selected colonies were morphologically, culturally and biochemically characterized on selective and differential media. Antibiotic susceptibility profiling was carried out using Kirby Bauer's agar disc diffusion method and the diameters of the inhibitory zones were recorded. The standard plate count ranged between 3.9 ×103and 17000×103cfu/g.220 bacterial isolates were obtained with 81% isolation frequency for Gram-negative bacteria. The isolates demonstrated lipolytic, proteolytic, ureolytic, deaminase producing-, hydrogen sulphide producing -, gelatinolytic and acid producing abilities.16% of the isolates demonstrated beta hemolysis. The presumptive identification revealed the presence of members belonging to the genera Escherichia, Staphylococcus, Listeria, Salmonella, Vibrio and Pseudomonas, indicating the potential to cause spoilage and hemolysis. Majority of the isolates exhibited resistance to vancomycin, ceftazidime and cefazolin. Regular testing, implementation of hygienic practices and appropriate storage of the seafoods are recommended.

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Recommendation System for Food Trucks

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The research analyses the food truck industry in India, emphasising its attractiveness as a result of inexpensive beginning costs, adaptable hours, and street food that reflects regional tastes and culture. This idea is a relatively new trend in India, but it has already become popular in the food industry in the West. A place's and its inhabitants' culture are fundamentally shaped by their food. Whether someone lives in India or abroad, food plays a significant role in their lives. Most often, when we think of street cuisine, we image little stalls lining the streets. These are the eateries where there are lots of people enjoying the cuisine that is served while you wait, satiating the eternal gourmet that resides inside them. The demographic representation of this activity in India appears in the form of all age groups. There are specific food lanes in every community that draw people to eat food on wheels. However, it also discusses the difficulties experienced by proprietors of food trucks, such as location, climatic conditions, legal issues, parking, storage space limitations, licences, and high initial costs. The research makes a number of recommendations to address these issues, including modernising venues, keeping up with local news and events, promoting regional cuisine, working with dining establishments, and experimenting with emerging trends like "bustaurants" and getting liquor licences. The study highlights that putting these solutions into effect will benefit the restaurateurs and customers, resulting in higher revenues for operators and having a good impact on the economy of the state or country. In addition, this case study displays interest in pursuing Project-Centric Learning (PCL) with possible reader input. In a nutshell, food trucks provide a practical and economical choice for quick lunches, and by addressing the issues and putting up creative solutions, the sector can develop and prosper even more. The intersection of social media and food PR is examined in this research. More precisely, it documents the emergence of mobile food trucks as a new sector that is utilising social media to its maximum potential and developing best practices that other sectors can choose to emulate. The purpose of this study is not only to investigate the rise of the food truck phenomenon as it parallels the rise of social media, not to mention investigate how gourmet food trucks have enhanced the standing of the food truck sector overall. Another aim is to study how the use of social media has contributed to company branding, with the ultimate outcome of developing recommendations on how to effectively use social media. The key issues discussed in this paper include the origins of mobile eateries, the factors that have led to the rise of food trucks in the digital age, the growing number of food truck patrons and the ways in which the emergence of gourmet food trucks has enhanced the standing of this particular dining trend. Results reveal that social media fuelled the food truck phenomenon as the trendy new —in‖ thing to do, not only for consumers, but also for restaurateurs. The main finding is that using social media to promote a company or product is now the norm for public relations, not just a passing trend.

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Autonomous Driving System: An Overview

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The advancement of autonomous driving systems is categorized into five levels, ranging from Level 0, which represents no automation, to Level 5, where vehicles operate entirely without human intervention. This research explores the nuances of these five levels, highlighting the progressive shift from driver assistance to complete vehicular autonomy. Each level signifies a critical step in the development of self-driving technologies, with corresponding changes in control, monitoring, and decision-making responsibilities.

In addition to examining these levels, this study investigates three distinct operational modes of autonomous driving systems:

1. Assisted Mode: This mode includes driver assistance technologies that enhance safety and convenience but still require constant driver supervision and intervention. Examples include adaptive cruise control and lane-keeping assistance, which provide support without replacing the driver's active role.

2. Automated Mode: In this mode, the vehicle can perform certain driving tasks autonomously, though human oversight remains necessary. This includes systems that can handle more complex

scenarios, such as highway driving with limited human intervention, but still require driver readiness to take control if needed.
3. Autonomous Mode: This mode represents full autonomy where the vehicle operates independently without any driver input. It encompasses the highest levels of automation (Levels 4 and 5), where the vehicle can handle all aspects of driving in defined operational domains or under all conditions without human involvement.
This research aims to provide a comprehensive analysis of how these three operational modes interact with the five levels of automation. By exploring the technological capabilities, operational challenges, and practical applications of each mode across different levels, the study offers insights into the current state and future potential of autonomous driving systems. The findings contribute to a deeper understanding of the integration of autonomous technologies into real-world driving environments, addressing implications for safety, regulatory frameworks, and user experience.

Keywords: Self-driving, Autonomous, Driving, System, Vehicles, Artificial Intelligent, Safety, Innovation, Technology.

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Assessment of Drinking Water Quality in the Southern Part of Bengaluru City

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The contamination of water by human activities limits drinking water resources. Poor drinking water quality has been linked to several diseases, particularly in developing countries, where the availability of potable water is a big challenge. The objective of the study was to determine the physicochemical and bacteriological quality of drinking water in southern Bengaluru. Ninety-six (96) water samples were collected from households, educational institutions, hospitals, hotels and restaurants, and roadside food vendors. The samples were subjected to pH, total dissolved solids (TDS), water hardness analysis, and enumeration of bacteria using the most probable number (MPN) count. The pH of the water samples showed 88 (91.6%) were within the normal range of 6.5-8.5 as recommended by the Bureau of Indian Standards (BIS), whereas, only 8 (8.3%) were out of the recommended zone. The TDS of the water samples measured showed 92 (95.8%) were within the standard requirements of 50-300 ppm and only 4 (4.2%) were above the standard of 300-500 ppm. Analysis of water hardness revealed 77 (80.2%) were soft, while 12 (12.5%) were moderate though within the standard of below 75–300 mg/L and 7 (7.3%) were hard and not permissible for drinking. The MPN test showed 46 samples (47.9%) had indices above 100 MPN/100 ml of water, which is considered a high risk for consumption. The water samples that do not meet the required standard may not be recommended for consumption. Regular monitoring of drinking water supplies, improved sanitation, and hygienic practices are suggested to safeguard public health.
Keywords: water quality, most probable number, total dissolved solids, water hardness, fecal coliforms

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Optimisation and Purification of the Galactosidase Enzyme from Almond (Prunus dulcis): A Study on Process Parameters and Purification Techniques

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Galactosidase enzymes, especially β-galactosidase, are important in the hydrolysis of galactosides and influence a large number of industries, especially food and biotechnological processing. Almonds (Prunus dulcis) are considered as a natural source of galactosidase, a potentially valuable one that needs to be further exploited to develop extraction and purification protocols. This involves optimization of major process parameters that favor the extraction of galactosidase from almond kernels: pH, temperature, enzyme-substrate ratio, and incubation time. After extraction, various purification methods, including ammonium sulfate precipitation, dialysis, and chromatographic methods such as ion-exchange chromatography and gel filtration chromatography, are adopted for purification of the enzyme to its maximum. The effectiveness of these techniques is evaluated based on specific activity, yield, and purification fold. This work reports the biochemical properties of the purified enzyme, kinetic parameters, and thermal stability. The values obtained provide a good framework for large-scale production of galactosidase from almonds, leading to sustainable and cost-effective development of the enzyme for several industrial applications.

Keywords : galactosidase, almond (Prunus dulcis), enzyme extraction, purification techniques, ammonium sulfate precipitation, chromatography, enzyme kinetics

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Neuromodulatory Opioid peptides from Food Sources: Wheat Gluten Exorphin

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Abstract:
Depression and anxiety are psychological disorders that have predominantly increased over the years and are currently being treated with antidepressant drugs. These drugs pose several side effects and fail to work on certain patients due to the varied therapeutic effects in different individuals. Opioid peptides seem to be a more suitable alternative due to their antidepressant properties and anxiolytic effects. The complexity of opioid peptides is reflected in their varied physiological effects and complex pharmacology, which can have opposing or complementary effects on living systems. There are 3 types of opioid peptides: endogenous, which are produced within the body, exogenous, which come from outside sources and synthetic opioid peptides analogues. Examples of endogenous opioids include enkephalins, endorphins, dynorphins, and nociceptin. Exogenous opioid peptides are derived from proteins found in external sources, like animals or plants. Additionally, synthetic opioid peptides can be produced by changing the structural makeup of pre-existing opioid peptides or by modifying their amino acid sequence. Collectively, these studies add to our knowledge of the roles played by opioid peptides with varying sequences and diverse sources. This research summarizes the discovery of opioid peptides, highlights significant discoveries, and stresses the necessity of more empirical study to completely comprehend the function these peptides play in human behavior.

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An Assessment of the Smart Health Assistant: A Self-Diagnosis and Disease Forecasting System Driven by Artificial Intelligence

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By implementing new technology strategies, the healthcare industry is reorienting its attention toward service improvement. In order to help the general population with basic medical care needs, this project suggests developing a 24/7 healthcare chatbot system. Through conversational interfaces, the suggested AI system would analyze symptoms of patients and medical histories to imitate a doctor's diagnostic process. A thorough development procedure involving cooperation between technologists and medical specialists is essential. The chatbot's goal is to reduce front-line healthcare workers' burden by offering easily accessible self-diagnostic and medical advisory abilities, particularly in times of increased demand or resource restrictions. Healthcare chat bots is an attempt to help regular people with their primary healthcare needs by lessening the pressure on medical frontline workers, with the growing need for medical services and the scarcity of resources. The healthcare chatbot is dependable to use because it can manage a lot of requests for assistance at once. Just the most up-to-date information from the chatbot's database is used to answer medical questions. The chatbot functions as a self-diagnostic tool, possibly relieving the burden on healthcare resources, even if it is not meant to replace expert medical consultations. This is a particularly useful tool during epidemics when access to personal medical attention is limited.
Keywords: Health care, Artificial intelligence, Disease diagnosis, ML, charbot

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Green Synthesis of ZnO/Ag Nanocomposites Using Gracilaria Algal Extract and its Application in Dye Degradation

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Nanobiotechnology combines nanotechnology and biology to synthesize nanoparticles (1-100 nm) from biological sources for diverse applications such as medicine, drug delivery, catalysis, environmental remediation, and biosensing. Although traditional methods have produced these materials, green synthesis is now favoured due to its eco-friendliness, cost-effectiveness, and efficient yields without high energy demands. Nanocomposites made through green methods are especially useful because of their unique capabilities, particularly in bioremediation—a process that employs biological entities to remove environmental pollutants and toxins. s that employs biological entities to remove environmental pollutants and toxins. This study examines the bioremediating potential of ZnO/Ag nanocomposites synthesized from the red algae Gracilaria. The nanocomposites were characterized using UV-Visible spectroscopy, FTIR, XRD, and SEM. The research revealed that optimal dye degradation occurred under light, with Reactive Orange 122 showing a degradation rate of 44.76% and Reactive Red 195 showing 29.59%. Similarly, under agitation, Reactive Orange 122 achieved 31.3% degradation, while Reactive Red 195 achieved 13.34%. Additionally, 100 mg of the catalyst was found to be particularly effective, with a maximum dye concentration of 100 ppm used for degradation. Overall, the degradation of Reactive Orange 122 was found to be more effective compared to Reactive Red 195 using these nanocomposites.

Keywords: Nanocomposite, Gracilaria, Dye degradation, Reactive Red 195, Reactive Orange 122, Bioremediation

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Effectiveness of ChatGPT Therapist Feature on Perceived Stress among Young Adults: An Exploratory Study

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Mental health of an individual determines the capability of an individual to operate psychologically, emotionally and socially. Considering the importance of mental health in every aspect of life, its crucial to protect and improve mental health and well-being of an individual. Mental health concerns are increasing day by day. Do we have equal amount of supply for the amount of increase in mental health cases?

The present study intends to explore the support through Artificial Intelligence in bridging the gap between demand and supply of mental health concerns. An exploratory study with mixed research design will be focused for the execution of the study. ChatGPT Therapist Feature (AI Feature) will be used among samples to explore the effectiveness of the app on perceived stress among young adults. The study will be executed in two phases. Phase I: Pre-post experimental research design will be used for the study. Samples will be instructed to use the ChatGPT Therapist Feature for 21 days. Perceived stress scale will be administered before and after the intervention. Paired sample t-test will be used for statistical analysis. Phase II: Selected samples from Phase I, will be facilitated with Focused Group Discussion by the scholars. Thematic and content analysis will be executed to understand the challenges and benefits of the Feature.

Keywords: ChatGPT Therapist, Perceived Stress, Mental Health Intervention, Artificial Intelligence, Demand & Supply

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Antioxidant Assessment and Phytochemical Characterization of Methanolic Extract from Lemna Minor

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Lemna minor is a hydrophyte that floats freely and belongs to the duckweed family. Lemna minor (LM) doubles quickly and has the capacity to produce enormous biomasses. Given the significance of antioxidant activity of plants, this study was conducted to assess the antioxidant potential of Lemna minor extract in vitro. Methanol of soluble fraction of defatted Lemna minor powder was tested for antioxidant potential using a battery of in vitro tests. Our study revealed that methanolic extract of Lemna minor exhibits appreciable antioxidant activity as revealed by Ferric reducing antioxidant power (FRAP), 1,1-diphenyl-2-picrylhydrazyl (DPPH) scavenging activity and total phenolic content. Further, mass spectroscopy-based assessment revealed presence of important phenolic acids and flavonoids in Lemna minor. Our study suggests that Lemna minor could be exploited as an important dietary source of antioxidants.

KEYWORDS:
Lemna minor (LM), Lemna minor extract (LME), Radical scavenging assay, Total phenolics, Ferric reduction potential

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Synthesis and characterization of biopolymeric k-carrageenan based Hydrogel/ Silver Nanogel as smart carrier of 5-FU in cancer therapeutics

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k-Carrageenan, a red seaweed polysaccharide, offers mucoadhesive, gelling properties for regulated medication release, with pH-sensitive release capabilities. In general, polysaccharide gels are highly desirable for drug delivery due to their ability to react to environmental stimuli like pH, temperature, and enzyme activity. This responsiveness enhances drug delivery precision, selectivity, and therapeutic results, reducing off-target effects and improving therapeutic outcomes. As in chemotherapy, has several challenges, including low drug solubility, non-specificity towards cancer cells, severe side effects, burst release of drug and multidrug resistance of tumor cells. 5-Fluorouracil, is a chemotherapy medication widely used to treat gastrointestinal cancers. 5-FU mimics uracil, a RNA component, disrupting cancer cells' RNA production and DNA synthesis, leading to cell death when incorporated into rapidly dividing cells.

Carrageenan hydrogels and silver nanogels were developed using KCl as a crosslinking agent. The characterization data revealed that the hydrogels/nanogel exhibited excellent swelling capacity, highly porous in structure, and contained a silver nanoparticle. 5-FU was loaded successfully into the gels with high entrapment efficiency. The drug release kinetics of the samples were monitored in a pH-2 buffer system mimicking the gastrointestinal tract environment. Furthermore, hemolytic assay of the gels showed a low hemolysis rate, indicating good biocompatibility. Consequently, the study provides encouraging results for the development of carrageenan hydrogel/ silver nanogel systems as 5-FU delivery carriers, especially under specific pH conditions, with potential applications in biomedical and pharmaceutical research.

Keywords: glyco nanogel, k-carrageenan, chemotherapeutic studies, drug delivery, pH-sensitive release.

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Green synthesis of silver nanoparticles using Petroselinum crispum and Piper betle leaves extract and their antibacterial effect against enterotoxigenic bacteria

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The green synthesis of silver nanoparticles (AgNPs) presents a sustainable alternative to conventional methods by using natural extracts for nanoparticle production. This study explores the synthesis of AgNPs using extracts from Petroselinum crispum (parsley) and Piper betle (betel leaf), two plants known for their rich phytochemical profiles. The antibacterial activity was determined in aqueous ,ethanol and butanol extracts using agar disc diffusion method. The minimal inhibitory concentration (MIC) of the plant extracts against selected bacteria were assessed using microdilution method.. The antibacterial efficacy of these AgNPs was evaluated against enterotoxigenic bacteria, particularly Escherichia coli, Staphylococcus aureus and Salmonella typhi. The silver nanoparticles

showed SPR under uv-vis at 380-420 nm Also, the results demonstrated that the butanol based Ag-NPs synthesized from these plant extracts had shown superior activity when compared with other individual extracts and nanoparticles. This study highlights the potential of using plant extracts as the reducing agents in the green synthesis of AgNPs and underscores their effectiveness as antimicrobial agents against enterotoxigenic bacteria offering a promising approach for developing novel antibacterial agents.

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Extraction & characteristics of secondary metabolites from the leaves of Coleus amboinicus as potential respiratory therapeutic agents

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This study explores the benefits of using Coleus amboinicus as a natural inhaler for respiratory issues. The plant's organic properties make it a safe and effective option for those seeking a non-toxic alternative to traditional inhalers. Researchs suggest that Coleus amboinicus may provide relief for individuals with asthma, bronchitis, and other respiratory conditions.
Coleus amboinicus, commonly referred to as Indian borage or Mexican mint, it's rich in forskolin, has been shown to relax airway muscles, reduce inflammation, and improve lung function . Since we are using traditional medicine in a modern or cutting-edge manner. Here, we're employing Coleus amboinicus leaves, which are primarily composed of carvacrol and camphor. Additionally, leaves are rich in beta-sitosterol, rosmarinic acid, cirsimaritin, oxalacetic acid, and flavonoids .
Since the leaf portion of Coleus amboinicus is what we're using, the distillation procedure is used to extract the chemical compounds listed above as essential oil. Since this diluted distilled extraction is packaged and constructed as an inhaler and can be stored for up to a year, we are not adding any kind of preservatives. Additionally, this extract doesn't have any negative effects.

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AI in Nanomedicine

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Nanomedicine holds tremendous potential for 'revolutionizing healthcare'through pioneering diagnostic tools and targeted therapies. However, notable challenges still presist in, enhancing drug delivery mechanisms, improving therapeutic efficacy, and optimizing nanoparticle design. This review critically analyses the growing integration of Artificial Intelligence (AI) in tackling these challenges within nanomedicine.
We examine key research studies that explore the transformative role of AI in various aspects of Nanomedicine.
Research from countries such as the United States, China, and Germany showcases innovative AI-based approaches to nanoparticle design. AI-driven models are being used to refine the material properties and interactions of nanoparticles with biological systems, leading to enhanced targeting

precision and more effective drug delivery outcomes.
AI algorithms process and analyze varied and vast amounts of patient database to predict the most effective drug delivery strategies, enhancing the tailoring of personalized medicine for individual needs. Treatment efficiency and delivery methods have leveraged due to use of AI, a testament which comes from studies based in United kingdom, South Korea and Japan.
As the advancement in nanomedicine continues, it comes at the cost of various emerging potential risks associated with nanoparticles. AI tools have shown a promising scope in the prediction of nanotoxicity and guiding design modifications for safer therapeutic applications. Research conducted in Switzerland, Australia and India based on these aspects, are focusing on leveraging AI to evaluate and mitigate potential toxicity.
In its initial phase during early 2010s papers focused on understanding the basic concepts and framework of AI techniques, this paved the path to the growth phase between 2016-2020 when use of deep learning techniques showed promising impact along with ability to enable complex analysis and AI driven discoveries.
Today we are in the maturity phase of this field starting from 2021 where AI driven nanomedicine is making its way to widespread adoption, personalized nanomedicine, improving accuracy and developing nano bio interfaces
This review incorporates findings from a diverse array of studies across these countries, underscoring the substantial potential of AI in accelerating progress within the field nanomedicine. The discussion extends to future prospects, highlighting how AI integration can continue to drive innovation in this rapidly evolving field, ultimately leading to more effective and safer nanomedicine applications.

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Teletherapy vs. Offline Therapy: A Comparative Study on Effectiveness, Accessibility, and Sustainability in Mental Health Care

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In the wake of rapid technological advancements, teletherapy has emerged as a transformative approach to mental health care, offering unprecedented accessibility and flexibility. This study critically examines the comparative effectiveness, accessibility, and user satisfaction of teletherapy versus traditional offline therapy, within the context of global efforts to promote sustainable health solutions in line with the United Nations Sustainable Development Goals (SDGs).
Employing a mixed-methods design, this research engaged 200 participants who have experienced both teletherapy and offline therapy. Quantitative data were gathered through validated assessment tools to measure therapeutic outcomes, while qualitative insights were derived from interviews and focus groups, exploring the nuanced experiences and preferences of users.
The results reveal that teletherapy not only enhances accessibility, particularly for individuals in remote or underserved areas, but also aligns with sustainability objectives by minimizing logistical barriers to mental health care. However, challenges related to therapeutic rapport and engagement were noted, suggesting that teletherapy may complement rather than fully replace offline therapy.
This study underscores the potential of teletherapy as a sustainable, scalable solution to global mental health needs, while advocating for an integrated model that capitalizes on the unique strengths of both therapy modalities. The findings offer valuable insights for policymakers, practitioners, and researchers committed to advancing mental health care in an increasingly digital world.

Keywords: Teletherapy, Offline Therapy, Mental Health, Accessibility, Sustainability

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Review on Hyperloop Transportation

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Companies globally have been trying to alter existing transportation systems to maximize public transport benefits, especially in the sector of high-speed (HS) ground transportation. The latest invention of such is Elon Musk's ultra-high-speed rail (UHSR), hyperloop. This technology enables a rail service to operate at a potential speed of 1,200 km/h. Hyperloop's ambitious speed goal has the potential to result in time-space shrinkage, which would then make distant cities more accessible with greatly reduced travel times.
Hyperloop is presented as a vacuum train operating under low-pressure conditions, utilizing water-based heat exchangers and on-board compression systems to enhance performance. The study is based on Newton's second law of motion and addresses the growing need for an alternative mode of transportation for short-haul routes.

This paper first investigates the key technical, environmental, economic and human considerations in assessing the applicability of hyperloop to a particular location. It also considers in some detail the likely urban and regional planning and transport policy implications of the hyperloop technology based on the known effects of existing high-speed rail (HSR) systems. The paper concludes that many of the claims about hyperloop are subject to contrary information, meaning that great caution and prudence are currently needed regarding attempts at commercial deployment.

Keywords: Hyperloop, Vaccum train,Newton's second law,Transport policy

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Intelligent Analysis of Student Performance in Online Learning Platforms Using Data Mining Techniques

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In the era of digital education, e-learning platforms are becoming increasingly popular. However, one of the significant challenges they face is ensuring that all students are adequately supported to achieve their learning goals. This project aims to develop a data mining system for e-learning platforms that can analyze student performance and identify those who are underperforming. By leveraging various attributes such as assignment scores, quiz scores, progress rate and completion rate and behavioral patterns, the system will provide early warnings and actionable insights to educators and also will be informed to their respective parents/guardians. The objective is to enable timely interventions, personalized learning paths, and data- driven decisions to enhance student success and retention rates. Additionally, the system will integrate placement links and career resources for students, offering them opportunities to connect with potential employers and access job postings relevant to their skills and performance. This project demonstrates the potential of data mining techniques to transform e-learning environments by fostering a more supportive and effective educational experience for all students. The algorithms like Naïve Bayes and decision tree gives accuracy rate of 95% and 98% respectively with precision rate almost equal to 1.

Keywords: Predictive Analytics, Student Performance Monitoring, E-Learning Personalization

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A cross sectional study about the increase presence of obsessive compulsive disorder among Covid survivors

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Pandemics are associated with bringing up a lot of emotional and physical distress, especially the ongoing Covid-19 pandemics which effectuate mental health-related problems globally. However, there is a lacuna of evidence for the association between the fear of Covid-19 and OCD. This study is aimed to study the effects of OCD on Covid-19 survivals.
The primary objective of this study is to investigate the relationship between the novel Coronavirus and OCD. The Yale brown obsessive-compulsive scale was used to identify the trait of obsessive-compulsive disorder post Covid infection. This research will add the insight and value of the relationship between the novel Coronavirus and obsessive-compulsive disorder for many future researchers.

Keywords : COVID-19, Contamination, Obsessive Compulsive Disorder, Washing

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Isolation of Endophytic Fungi from Plectranthus amboinicus: A Novel Source of Antimicrobial Agents

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Endophytic fungi produce secondary metabolites that might prove to be an important source of bioactive compounds. Endophytes derived from medicinal plants have shown promising results in terms of producing bioactive substances which are highly potent antimicrobial substances. In this study, 10 distinct endophytic fungi were isolated from the plant *Plectranthus amboinicus*. Ethyl acetate crude extracts of the fungal isolates were tested for their antimicrobial activity against the test pathogenic bacteria *Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa*, and *Bacillus subtilis* using disc diffusion assays. Two fungal isolates (CALF1, CALF4) out of the 10 fungal isolates tested showed antimicrobial activity against the test pathogenic bacteria. The zone of inhibition ranged from 13.5 mm to 36 mm for CALF1 and from 11 mm to 22.5 mm for CALF4. *B. subtilis, S. aureus* and *E. coli* showed greater susceptibility than P. aeruginosa to both CALF1 and CALF4 endophytic fungal extracts. The MIC values ranged from 3.12 mg/mL to 6.25 mg/mL. *B. subtilis* and *E. coli* showed the highest susceptibility (at 3.12 mg/mL), while *S. aureus* and *P. aeruginosa* exhibited the least susceptibility (at 6.25 mg/mL) to CALF1. For isolate CALF4, all test bacteria showed susceptibility at 6.25 mg/mL. These isolates will be identified by analysis of 18s RNA gene sequencing and the bioactive compounds in the crude extracts of the two isolates were identified by GC-MS analysis. These findings highlight the potential of endophytic fungi from *P. amboinicus* as a promising source of novel antimicrobial agents, requiring further investigation into their bioactive compounds.

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Exploring the Antimicrobial Potential of Endophytic Fungi from Sweet Flag (Acorus calamus): A Promising Source of Novel Therapeutics

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Fungal endophytes derived from medicinal plants are valuable sources for the identification of natural products and bioactive compounds with potential uses in the fields of industry, medicine, agriculture, and related sectors. In this study, endophytic fungi were isolated from the medicinal plant *Acorus calamus*. The rhizome of this plant yielded 5 different distinct endophytic fungal isolates. Ethyl acetate crude extracts of the fungal isolates were tested for their antimicrobial activity and MIC against the test pathogenic bacteria *Escherichia coli, Staphylococcus aureus, Pseudomonas aeruginosa* and *Bacillus subtilis* using disc diffusion assays and microdilution method respectively. Two fungal isolates (ACR-12 and ACR-15) out of the 5 fungal isolates tested showed potential antimicrobial activity against the test pathogenic bacteria. The zone of inhibition of the antibacterial activity test ranged from 2mm to 7mm for ACR –12 and 3 mm to 5 mm for ACR-15. The MIC value of ACR-12 was found to be 3.125 mg/mL and 1.5625 mg/mL against test pathogen *P. aeruginosa* and other test pathogens respectively. The MIC value of ACR-15 against all the test pathogens was found to be 2.125 mg/mL. Additional tests, such as MTT assays to determine potential cytotoxicity and 18s rRNA gene sequencing to identify the isolates, will be performed. Further isolation and identification of these secondary metabolites by using GC-MS will be undertaken in order to identify the particular compound demonstrating antibacterial action. This initiative could result in the identification of novel medicinal molecules.

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Microbial Degradation of Chlorpyrifos: Challenges, Pathways, and Future Directions in Bioremediation

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Among different classes of pesticides, chlorpyrifos (CPF) is an organophosphorus pesticide widely used in agriculture. This pesticide has dramatically degraded the environment due to its overuse and has impacted both terrestrial and aquatic ecosystems. As CPF itself is recalcitrant in the environment, its chlorinated breakdown products are highly persistent and more hazardous to the environment. This requires efficient degradation of CPF and its metabolites, wherein bioremediation seems to be a feasible low-cost option. Though previous research documents microbial strains capable of degrading CPF, this degradative process is complicated since the chlorine atoms are released during the mineralization of the pesticide that inhibits the microbial growth. Therefore, microorganisms capable of simultaneous mineralization of TCP and its metabolites needs to be explored. This review focuses on the metabolic pathways and the challenges faced during the microbial degradation of CPF. It also attempts to give an in-depth overview of the proposed microbial species involved

in CPF degradation. Based on the literature survey, this review confirms that bioremediation is a potential intervention for the treatment of wastewater to eliminate pesticide residues. Furthermore, bioremediation can be combined with promising hybrid methods, such as photocatalytic degradation, to be considered as a good option for dealing with recalcitrant pesticide like CPF. A review of this nature calls for continuously furthering investigation on microbial strains and state-of-the-art methodologies for addressing the perennial issue of environmental pesticide contamination.

Keywords: Chlorpyrifos, pesticide, xenobiotics, environmental contamination, bioremediation

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An Introduction To Analyzing Stellar Spectra

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In this project, we investigate stellar spectra by reducing and analyzing raw spectral data (which is in the optical range) from astronomical observation using IRAF (image reduction and analysis facility) software. Stellar spectra provide crucial insights into the composition, temperature and other properties of stars. Our approach involves the normalization of the raw data and identifying the absorption spectral lines which are produced due to atomic transitions. And this is followed by measuring the equivalent width of the spectral lines which helps in further analysis of spectra.

Keywords: Stellar spectra; Stellar parameters; Atomic transitions; IRAF

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Revisiting thermogenic compounds with prebiotic potential; Exploiting the Gut-BAT axis

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The gut microflora is a combination of all microbes that live in the digestive tracts of animals including humans. The influence of these gut microbes on the physiology and metabolism of the body is profound. It is notable that minor variations within the body and changes in external environment can largely affect the gut microbiome which can in turn affect our physical, emotional and mental well-being. Prebiotics are compounds that can promote the growth of the beneficial gut microbes. They may include indigestible carbohydrates such as inulin, oligofructoses and fibres, among others. Among the vast majority of compounds that are explored for their prebiotic potential, the spices are a popular choice.
The process of Non-shivering Thermogenesis (NST) in Brown Adipose Tissue (BAT) has attracted attention due to its application in managing obesity. Thermogenic potential of spices in activating NST in BAT is well established. Beyond the sympathetic tone, newer molecules are now known to activate BAT. The GUT-BAT axis is currently being explored to identify if variation in the gut microbiota can alter the thermogenic potential of BAT or modify the overall thermogenic response of the body. In the present study, we summarize the current understanding of the effect of gut microbes

on BAT activity and the role of thermogenic compounds in increasing the number of beneficial gut microbes.

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Bamboo-Derived Activated Carbon for the removal of tetracycline from wastewater

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Adsorption is a very popular and efficient technique for the removal of various pollutants from water. Researchers have identified multiple adsorbents and among them biowaste activated carbon is reported to be highly efficient. In the present study carbon is prepared from bamboo scraps (BAC) and is activated by zinc chloride. Zinc chloride activation improves the property of the carbon and will aid in the adsorption process. The main aim of the study is to prepare activate carbon from bamboo culms and use it as an adsorbent for the removal of tetracycline from wastewater. The activated carbon prepared is characterised by different methods. The different methods include: Scanning Electron Microscopy (SEM), Xray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), Brunauer-Emmett-Teller (BET) and Zeta potential. The porous nature of the BAC was evident from the SEM analysis, the semi crystalline nature was observed by XRD, the presence of various functional groups was implicated by the FTIR results, the BET results discovered a surface area of 790 m2/g and negative surface charge was indicated by the zeta potential results. All the above results indicate that the BAC is a potential adsorbent and can be utilized for removal of various pollutants from water. The batch study was conducted considering the following factors: adsorbent dosage, contact time, pH, pollutant concentration and temperature. Based on the ideal conditions a pollutant removal efficiency of nearly 80% was achieved by BAC. The adsorption capacity of BAC was found to be 85mg/g. The study results were the best fits for Langmuir isotherm and pseudo-second-order kinetics indicating monolayer adsorption and chemisorption. The adsorbent is equally effective even while treated for real time sample.
Keywords: bamboo clums, activated carbon, biowaste, characterization, removal efficiency

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Identification and Characterization of Antibacterial Agents from Soil-Borne Bacteria in Mining Areas of Bellary District, Karnataka

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This study investigates the bacterial species present in soils from mining areas in Bellary District, Karnataka, and explores their potential as antibacterial agents. Soil samples were collected and subjected to a series of analyses, including staining, biochemical testing, and screening for antibiotic production. The antibacterial activity of the isolates was evaluated against a range of clinical pathogens:

Escherichia coli, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Enterococcus faecalis*, *Acinetobacter spp.*, *Staphylococcus aureus*, and *Proteus mirabilis*. Isolates demonstrating potent antibacterial activity were further analyzed. Their broths underwent ethyl acetate extraction, and the resultant ethyl extract was re-evaluated for antibacterial efficacy. The most effective isolate, designated SR1, were characterized using 16S rRNA sequencing, which identified it as a *Bacillus spp.* Phylogenetic analysis corroborated this identification. The results underscore SR1's notable antibacterial activity against the tested clinical pathogens, suggesting its potential as a source of new antibacterial agents. Current efforts are focused on further characterization of the antibacterial compounds produced by *Bacillus spp.* to understand their mechanisms and potential applications.

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Characterization of Extreme Halophiles from Bay of Bengal: Insights into Antibacterial Activity and Molecular Identification

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Halophiles are extremophiles that thrive in environments with high salt concentrations and are classified based on their halotolerance as slight, moderate, or extreme. Most extreme halophiles belong to the Archaea domain and are adapted to saline conditions, making them typically unable to survive outside their native high-salt environments. This study focused on isolating and characterizing halophilic bacteria from seawater samples collected from three sites along the eastern coast of Tamil Nadu: Tuticorin, Mandapam, and Kuthenkully. Marine bacteria were isolated using Zobell marine media, and Starch M-Protein agar. The isolates were identified through staining and biochemical tests. Subsequently, their antibacterial activity was tested against a panel of clinical pathogens. Among the isolates, one demonstrated significant antibacterial activity and was further characterized molecularly. This potent isolate was identified as a member of the Archaea domain, likely an extreme halophile, based on 16S rRNA sequencing. The findings highlight the potential of halophilic bacteria from the Bay of Bengal as sources of novel antibacterial agents. The study concludes that extreme halophiles from saline environments can produce compounds with significant antibacterial properties, suggesting their potential utility in developing new antimicrobial treatments.

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Fungal Phytases: Production and Biotechnological Applications

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The major form of organic phosphorus in seeds is a class of anti-nutritional factor called phytic acid, whose ill-effects can be eliminated by the activity of phosphatases. Monogastric animals suffer from mineral deficiency and phosphorus pollution due to phytic acid excretion as they lack the enzyme to utilize phytate-phosphorus. Among the fungal phytases, those from Aspergillus species have gained popularity due to magnificent attributes such as wide substrate selectivity spectrum along with thermostability and protease resistance. The production of fungal phytases by fermentation

with different agro-industrial byproducts has shown to be a low cost approach. The synthesis of phytases is influenced by physical and chemical factors such pH, temperature, initial media component concentrations, etc. Efforts to enhance the production of phytase by mixed substrate fermentation have been made. There is a sharp increase in phytase production after the optimization of culture conditions. Fungal phytases are capable of dephytinizing feed and food, by releasing soluble proteins, carbohydrates and minerals to improve the nutritional quality. In addition to aiding in the transfer of phosphorus and other nutrients needed for plant growth, fungal phytase are applied to bread-making industry, myo-inositol phosphates production, biofuel fabrication, semi-synthesis of peroxidase as well as environmental pollution control. The principal discussion in this review will be on the synthesis of fungal phytases and their applications in different biotechnological sectors.
Keywords: Phytic acid, phytases, fungi, fermentation conditions, agro-wastes .

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Multiple linear Regression modelling for predicting noise pollution

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Noise has become a nuisance to the environment and is growing so fast that it will ultimately jeopardize people's quality of life. Noise has increased significantly all over the world during the past few decades, but especially in densely populated areas. The main negative impact of increased noise pollution on the human environment is human physiology and psychology reduction. In response to road traffic noise being one of the most important causes of environmental pollution, there have been design models which help us predict traffic clamour level.
One such approach is adopted in this study to forecast road traffic noise in Bengaluru with specific reference to road conditions within the city. One recent research was done at a known site along Kanakapura Main Road (KMR) in Bengaluru. The two locations are situated along KMR while more than 3000 measurements were made during a single day. A novel traffic model for Bengaluru was developed using complete dataset with an aim of extending it as forecasting noise levels and as a supplementary forecasting tool. Accordingly, this investigation indicates that the produced Leq model's prophesy value is ±2% dbA value truthfulness.

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Effect Of Smoking On The Total Concentration Of Salivary Protein And Morphology Of Buccal Cells

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Saliva is common biological evidence found in the crime scene. There are no ways to determine whether the saliva is of a smoker or non-smoker which would aid for the investigation. Our study is to determine the effect of smoking on the total concentration of salivary protein and morphology of buccal cell in different types of smokers. The types of smokers to be studied are occasional smokers, moderate smokers and chain smokers. The sample of 20 healthy individuals are to be collected. Total protein concentrations of saliva that are usually affected by the toxins present in cigarette smoke. The total protein concentration calculation is performed by the Bradford method in which protein concentration is quantitatively analysed. The morphological variation of the buccal cells was observed using microscopy method. Our study shows that the variations of total protein concentration between different types of smokers are less significant and there is a difference in the morphology of the buccal cells such as binucleated and bilobed cells were observed in different types of smokers. The buccal cell morphology varies in smokers and non-smokers. This difference in the morphology of buccal cells can be used in narrow downing the suspect list from salivary samples.

Keywords: Saliva, salivary protein, buccal cells, smoking

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Experimental Analysis Of River Sand Concrete And M-Sand Concrete Strength Comparisons Using Alccofines

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In this paper, the strengths of concrete made with river sand and concrete made with M-sand and cement substituted with alocofine are compared. Cement replacement materials and chemical and mineral admixtures may be able to enhance the strength and durability properties of concrete, according to recent efforts to improve the performance of concrete. A pozzolanic substance called alccofine (UFGGBS) may be used to create concrete that is incredibly resistant. The concrete samples underwent standard moist curing at standard ambient temperatures. At 7 and 28 days, the compressive strength was assessed. Alcofine's inclusion demonstrates an early strength-gaining property. Enhancing concrete's resilience to provide it a longer lifespan and creating greener concrete are now critical requirements for getting high-quality concrete.
A mineral additive called Ground Granulated Blast-furnace Slag (GGBS) makes new concrete easier to work with and pump. Reduced pore connections in blended cement concrete result in a reduction in permeability and an increase in the concrete's resistance to chloride penetration. The amount of greenhouse gases created during the concrete production process as well as the energy used to make the concrete are significantly decreased with the usage of GGBS. In terms of dispersion and chemical reactivity effects, Ultra Fine GGBS (UFGGBS) with an average particle size less than 10 m and a Blaine surface area larger than 600m2/kg may significantly enhance the qualities of the concrete. The UFGGBS has a better filling effect than GGBS and accelerates hydration and pozzolanic processes.

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Network structures, manifold learning and disease management

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Infectious diseases continue to pose a significant global health challenge. Mathematical modeling has emerged as a critical tool for understanding disease dynamics and informing public health interventions. This paper provides a comprehensive overview of modeling infectious disease epidemics on networks, progressing from the simple Erdős-Rényi random graph to more complex structures. We delve into the intricate relationship between network topology and disease transmission in the setting of graph structures embedded on a manifold. A particular emphasis is placed on the connection between random graph theory, percolation theory, and dynamical systems, providing a robust theoretical framework for analyzing disease spread.Furthermore, the paper addresses the complexities introduced by networks with a high density of short closed loops, which can significantly impact disease dynamics. By examining these factors, we aim to contribute to the development of more accurate and effective models for predicting and controlling infectious disease outbreaks. We see a potential model to make an informed decision regarding targeted public health interventions, optimize resource allocation, and ultimately mitigate the impact of future epidemics.
Key words: manifold learning,

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Green Synthesis of carbon Quantum dots

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Carbon Quantum Dots(CQDs) have several applications due to their exceptional optical, chemical, and electrical properties. These materials are non-toxic and biocompatible, ideal for biological and medical applications like medication delivery, tissue engineering, and fluorescent bioimaging. As a result, we synthesized CQDs, utilizing the green synthesis technique with the Aegle Marmelos fruit as a carbon source. The synthesis method takes environmental factors into account, producing CQDs with desirable properties such as increased water solubility, low toxicity, and high stability. We examined the UV-visible absorption and luminescence spectra to understand the quality of the quantum dots better. Here, we look at the antioxidant and electrochemical characteristics in further detail.

Keywords: Carbon Quantum Dots (CQDs); Green synthesis; Optical Properties; Anti oxidation.

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Biogenic synthesis of palladium nanoparticles; ultrasonic mediated catalytic activity towards Suzuki-Miyaura cross-coupling reaction and nitroarenes reduction in water medium

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This work aims at the green synthesis of palladium nanoparticles through green method using renewable and non-toxic leaves of (Polyalthia longifolia) extract as a reducing and protectant. The synthesized nanoparticles was named as Pl/Pd(0) and was used as an catalyst for the Suzuki coupling and nitroarene reduction reactions. The results showed that only 2 mg of catalyst was sufficient for the Suzuki coupling yielding the upto 96% of desired product and 1 mg could effectively convert the nitroarene yielding 99% of the corresponding arylamine. The catalyst also gave good results for the heterogeneity test for both the reactions it is noted that the same can be reused in the reaction upto to 5 consecutive cycles.

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Magnetic Studies of Sr and Sn Doped $BaFe_{12}O_{19}$ Nanoparticles: Sustainable Synthesis for Spintronics Applications

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In this study, we synthesize $BaFe_{12}O_{19}$ (BaM) using the hydrothermal method with various combinational doping of Sr and Sn via the combinational analysis (1-X).(1-y).x.y, exploring both X=Y and X≠Y configurations. $BaFe_{12}O_{19}$ is known for its potential in spintronics applications, particularly as a candidate for high-density magnetic storage and microwave devices due to its high coercivity, magnetic anisotropy, and thermal stability. We adopt a sustainable approach in this research, aiming to minimize environmental impact while synthesizing and studying the material. We systematically investigate the structural, magnetic, and electronic properties of these doped samples through fundamental characterizations, including X-ray diffraction (XRD) for phase identification and crystal structure analysis, Scanning Electron Microscopy (SEM) for surface morphology and particle size determination, and Vibrating Sample Magnetometry (VSM) for magnetic property assessment. Additionally, we perform Mössbauer spectroscopy to analyze hyperfine interactions and electron spin resonance (ESR) to investigate the magnetic dynamics. These analyses determine how Sr and Sn doping influences the magnetic properties and spin dynamics of $BaFe_{12}O_{19}$, contributing to its potential application in spintronics

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Recent progress of the Maxene's for energy applications

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MXenes, a family of two-dimensional (2D) transition metal carbides, nitrides and carbonitrides, have garnered a global attention because of their promising applications in Energy convention and storage (ECS), Electromagnetic interference shielding sensing, catalysis, biomedicine, and more. In the past several years, many MXenes derivatives with different structures have been successfully prepared and their impressive performance demonstrated in ECS. Here we are going to discuss the recent advances of the state of art protocols and other parameters for improving the efficiencies of MXenes for energy conversion and storage applications.

Keywords: 2D materials; Energy; Mxene; Synthesis methods

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Exploring the Potential of Plant Probiotic Microorganisms for Advancements in Agriculture

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The symbiotic relationship between plants and microorganisms, particularly plant probiotic microorganisms (PPM), holds immense promise for revolutionizing agriculture and forestry practices. This paper explores the potential of harnessing PPM to address pressing challenges facing global food security and environmental sustainability. PPM, which include beneficial bacteria, fungi, and endo mycorrhizae, play pivotal roles in promoting plant growth, enhancing nutrient uptake, and mitigating environmental stresses. By forming symbiotic associations with plants, PPM contributes to increased crop yields, reduced reliance on chemical inputs, and improved soil health. The paper reviews the diverse mechanisms through which PPM exerts their beneficial effects on plants, highlighting the intricate interplay between microbes and their host plants. Additionally, case studies exemplify the practical applications of PPM in agriculture, such as enhancing the growth of valuable tropical hardwood trees for sustainable harvesting and promoting reforestation efforts. Overall, this paper underscores the potential of PPM as valuable tools for advancing agricultural and forestry practices towards greater sustainability and resilience in the face of ongoing environmental challenges.

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Synthesis And Characterization Of Nanocomposites For Supercapacitor Applications

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Graphene Oxide, CoFe2O4 and GO-CoFe2O4 were synthesised Under Hydrothermal method, Centrifuged and characterized. GO synthesised using Graphite powder and AgNO3. CoFe2O4 synthesised using FeCl3 and CoCl2.6H2O. These two were mixed with ethanol and hydrothermally treated. Powdered samples were obtained and characterized. UV study gives the Tauc Plot of GO and CoFe2O4 gives Eg of 3.3eV and 2.33eV respectively. The synthesised samples were applied for supercapacitor applications and the supercapacitance value is obtained. Further research is to combine the above materials with Chitin and FCNT which have good supercapacitive behaviour.

Keywords: Graphene Oxide, CoFe2O4, GO-CoFe2O4, Supercapacitor applications.

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Systematic Literature Review for Marathi Digit Recognition using EEG Signal

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Human - Computer Interaction (HCI) systems that use electroencephalography (EEG) to recognize numbers have the potential to improve new features by incorporating critical human data. This work relates to the systematic literature review and is a crucial component of the study on Marathi Number Recognition using EEG Signals. In this study, 300 chosen publications from the 2019–2024 IEEE Xplore, Science Direct, Google Scholar, ACM, and Pub Med databases were analyzed. This literature study provides all the necessary parts for an EEG-based number recognition system. Which comprise methods for classifying signals, pre-processing, feature extraction, and feature selection. The review of the literature makes it clear that EEG signals may be used for gadget handling, biometrics, medicine, and entertainment. When compared to India, the US, UK, and China have higher research densities. Our review of the literature revealed that relatively few studies use EEG signal processing for number identification and none use it to recognize Marathi numbers. This encourages us to work on Marathi number recognition using EEG signals.

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Mathematical Approaches to Optimize Crop Yield

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The optimization of crop yield is crucial for addressing global food security challenges, and Linear Programming Problems (LPP) offer powerful mathematical tools for this purpose. LPP is employed to model and solve complex agricultural problems, allowing for the efficient allocation of resources such as land, water, and fertilizers to maximize crop productivity. This approach involves defining an objective function, typically to maximize yield or profit, subject to a set of constraints that represent the availability of resources, environmental factors, and crop requirements. By formulating the crop yield optimization problem as an LPP, it is possible to identify the best combination of crop types and resource allocations that achieve the highest possible yield under given conditions. The constraints can include factors such as soil quality, water availability, labor, and budget limits, ensuring that the solution is both practical and sustainable.

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A face pack formulation with antioxidant attributes

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The invention pertains to a novel face pack formulation based on Borassus flabellifer endosperm pulp. This formulation, comprising 60-65% w/w Borassus flabellifer endosperm pulp along with agar agar, glycerol, carboxymethyl cellulose, citric acid, sodium benzoate, Cinnamomum tamala leaf powder, mannitol, and water, aims to leverage natural ingredients to deliver skincare benefits. The face pack is rich in phenolic compounds, primarily sourced from Cinnamomum tamala leaf powder, which contribute to its potent antioxidant activity. The method of preparation involves blending the ingredients to form a preparation, which can be applied on face. In vitro tests revealed that the formulation can form a film, in addition to exhibiting enhanced antioxidant activity owing to inclusion of Cinnamomum tamala leaf powder. This innovation addresses the need for environmentally friendly, natural skincare solution that provides consistent results without the drawbacks associated with face packs containing synthetic polymers.

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Edible Bran-Utensils: Paving the Way for a Greener and Healthier Future

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Plastic cutlery, though viable, has significant social, environmental, and economic impacts. Highly energy-intensive production methods that cause ecological damage are posing a threat to ecosystems and lead to sea contamination. Disposable plastic cutlery has become increasingly common in several restaurants owing to its outstanding toughness and affordable price. Recycling plastic utensils is difficult and costly, resulting in increased pollution and environmental damage. Furthermore, toxins like Bisphenol A and polyethylene terephthalate in plastics, directly or indirectly can leech into food, causing health hazards. A demand exists for plastic replacements or better solutions. Furthermore, public awareness and the implementation of protective measures are being done to mitigate the detrimental effects of plastic contamination on the ecosystem. To reduce the amount of plastic waste entering the environment, great efforts are made all over the world to give the finest replacement for plastic disposals with equivalent features. One of the best replacements for plastic is edible cutlery. Edible cutlery will be a sustainable alternative as it is eco-friendly, biodegradable, and nutritious without any side effects. Our research work targets in manufacturing of edible cutlery using defatted rice bran as the chief ingredient (a residue of rice bran oil processing) that has several nutrients and active compositions with other multi-grains. These biodegradable utensils decrease pollution, encourage healthy eating, and reduce reliance on single-use plastics. A transition towards greener dining experiences can be achieved and restrict plastic cutlery usage hence promoting consumer awareness, ultimately helping the environment and public health.
Key Words: Edible Cutlery; Defatted rice bran; Biodegradable; Nutritious; Sustainability.

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Solar Maximum Power Point Tracking Techniques: An Overview

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The increase in the energy demand inspires researchers to research on various clean energy resources like wind energy, solar energy, etc., Solar energy is one of the most efficient renewable energy resources that is abundantly available. large increase in the usage of Photovoltaic cells has been seen in the past few years in grid-connected and stand-alone inverter systems. The Output of Photo-Voltaic cells depends on the environmental conditions such as solar irradiations and temperature. The major challenge is to optimize the output of solar PV systems using Maximum power point tracking (MPPT) technique. This paper focus on the different MPPT techniques and their comparisons. This paper is useful for researchers in the field of solar inverters.

Keywords: Maximum Power Point Tracking (MPPT) , Photovoltaic cell, Renewable energy, solar inverters.

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An Innovative Questionnaire-Based Model for Predicting New Addiction

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Addiction is defined as an individual's fixation on a certain activity that interferes with their everyday activities. Individuals suffer from addictions to a variety of things. People are addicted to many different things, such as drugs, alcohol, gambling, pornography, and so on. These days, a new kind of addiction technological addiction has to be investigated. Establishing a baseline to identify people who are addicted to technology is the most challenging part of this research. To achieve this aim we created a brief questionnaire with 12 questions under the direction of a neurologist. In this research, we suggested an adaptive predictor that uses machine learning methods to estimate the degree of technology addiction. As of right now, 500 participants' totally completed records have been processed. The data of participant processed at different scales. Additionally, we compare several categorization algorithms. This study is one of the important part of our research technology addiction using EEG signal. In this study we mark the people that are addicted and then they are used for the future study using EEG signal.

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The relationship between Triguna and Sustainability Attitudes among Young Adults

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Studies on the psychological elements influencing pro-environmental behavior have been spurred by the recent focus on sustainable living. This study looks into the relationship between young people's attitudes about sustainability and the Indian philosophy-based Triguna Personality Theory. According to Triguna theory, there are three forms of personality: Rajas (activity and passion), Sattva (purity and harmony), and Tamas (ignorance and fear) (Dhulla, 2011; Kakkar et al., 2022). People who have a dominant Sattva guna are thought to have more sustainable attitudes than people who have a prominent Rajas or Tamas guna. The study will target young adults between the ages of 18 and 30 and use a cross-sectional survey method to gather data on their attitudes using the Sustainability Attitudes Scale (Zwicke & Jonas, 2008) and the Vedic Personality Assessment (Wolf, 1999). The goal of the research is to create sustainable behavior by fusing contemporary psychological insights with conventional frameworks such as Triguna theory. This approach may prove advantageous in the creation of focused therapies for various personality types. The study's implications include the possibility that the knowledge gathered from it will be useful in the development of targeted therapies intended to promote sustainability among different personality types.

Keywords: Triguna Theory, Sustainability Attitude, Young Adults, Personality, Pro-environmental Behavior

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Stability Analysis of Satellites in LEO and Geo using IRNSS receiver

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The study focuses on the effects of various parameters on the satellite orbits. It aims to determine satellite stability in both Low Earth Orbit (LEO) and Geostationary Orbit (GEO) using data from the Indian Regional Navigation Satellite System (IRNSS) at Jain University. This method is used to determine the stability by collecting data on the satellite positions over 6 months and monitoring changes in their positions. Subsequently, the factors that cause these changes including solar radiation pressure, geomagnetic disturbances, thruster firings, impacts from micrometeoroids, and gravitational waves will be addressed.
Through a systematic data collection and analysis method, graphs will be plotted to illustrate how satellite positions fluctuate under different conditions. These graphs will support the derivation of mathematical models and equations that can predict and adjust satellite positions with greater precision and efficiency in response to the observed variations. The research aims to improve both theoretical models and practical methods for satellite position management, leading to more robust and cost-effective satellite systems. This will enhance the reliability and extend the operational lifespan of space missions.

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Metal Immobilized on Functionalized Titanium Nanoparticles: An Efficient Nanocatalyst for Carbon-Sulfur Coupling Reactions

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The construction of the C-S bond plays a very important role in the synthesis of natural products, drug molecules, and pesticides. This work reports a highly efficient method for synthesizing diaryl sulfides using a titanium-based nanocatalyst. The nanocatalyst was prepared by doping metal on functionalized titanium dioxide. The synthesized nanocatalyst was found to be an efficient catalyst for the Carbon-Sulfur bond formation reaction. The method gave products with good yields with a wide variety of substrate scopes. The synthesized nanocatalyst was found to be heterogeneous; therefore it was recycled and reused. Hence, the developed method would be eco-friendly and sustainable. The synthesized nanocatalyst was characterized using various characterization techniques like FTIR, XRD, EDX, and SEM. The coupled products synthesized using the nanocatalyst were characterized using 1H and 13C NMR.

Keywords: Titanium-based nanocatalyst, C-S coupling reaction, Diarylsulfides synthesis

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Innovative Approaches in Nanotechnology: Endophytes as Bio -factories for Antioxidant and Antimicrobial Nanoparticle

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The current study investigates the possibility of using endophytes, which are symbiotic microorganisms residing within plant tissues, as innovative biofactories for synthesizing nanoparticles (NPs). This study took advantage of the unique metabolic pathways of fungal endophytes to mycosynthesize NPs, which were subsequently characterized using Scanning Electron Microscopy (SEM), X-ray Diffraction (XRD), and Fourier Transform Infrared Spectroscopy (FTIR). These techniques confirmed the nanoparticles'size, morphology, and functional groups, highlighting their potential bioactivity. To further demonstrate such activity, DPPH and FRAP assays were conducted, where the NPs exhibited robust antioxidant activity. Additionally, the NPs demonstrated a significant enhancement in glucose uptake in in-vitro conditions, indicating potential applications in diabetes management. Broad-spectrum antimicrobial efficacy was also observed against various pathogenic fungi and bacteria. This research highlights the dual benefits of utilizing endophytes for nanoparticle synthesis: promoting environmental sustainability and advancing global health. The findings pave the way for innovative, eco-friendly solutions to pressing health issues, emphasizing the role of endophytes in fostering a sustainable future.

Keywords: Endophytes, Nanoparticle Synthesis, Antioxidant Activity, Antimicrobial Efficacy, Diabetes Management

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Partial purification and characterization of a complex sugar specific lectin from the tubers of Coleus rotundifolus

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The tubers of Coleus rotundifolius, commonly called chinese potato, are commonly consumed as food in the Konkan coast in India and several parts of Africa. These tubers are also utilized in traditional medicine due to their high content of polyphenols and alkaloids. However, this plant has not been explored for the presence of proteins of biomedical significance.
The present study aims to identify, characterize and partially purify a complex sugar specific lectin from the tubers of Coleus rotundifolius.
The crude extracts of the tubers agglutinate O group human erythrocytes. The lectin exhibits maximum activity at 30°C and pH 7. The lectin is inhibited by complex sugars and minimal inhibition with simple sugars and can withstand high salt concentrations as evident by salt stress experiments. Further characterization can establish biochemical properties of the lectin and this will help us propose applications in health sciences or in agriculture.

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Green Spaces for Sustainable Health: The Intersection of Waste Management, Nutrition, and Well-being

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Green areas play a critical role in the intersection of waste management, health, and nutrition, offering multifaceted benefits to urban and rural communities alike. This abstract explores the relationship between green spaces and these key aspects of sustainable living.
Green areas, such as parks, community gardens, and urban forests, contribute to effective waste management by providing spaces for organic waste composting and promoting recycling initiatives. The integration of composting facilities within green spaces reduces the burden on landfills, mitigates greenhouse gas emissions, and creates nutrient-rich soil that can be used to support local agriculture. This, in turn, enhances food security and provides access to fresh, nutritious produce, particularly in urban settings where food deserts are prevalent.
Furthermore, green spaces positively impact public health by offering environments that encourage physical activity, reduce stress, and improve mental well-being. The presence of well-maintained green areas is associated with lower rates of obesity, cardiovascular diseases, and mental health disorders. Additionally, the air purification properties of vegetation help to reduce pollution levels, leading to improved respiratory health for community residents.
However, the implementation and maintenance of green spaces face challenges such as land scarcity, funding limitations, and the need for ongoing community engagement. Addressing these challenges requires a holistic approach that includes public-private partnerships, community-driven initiatives, and innovative urban planning. Educational campaigns to raise awareness about the benefits of green spaces and sustainable waste management practices can also drive community participation and support.
In conclusion, the integration of green areas with waste management strategies not only enhances environmental sustainability but also promotes health and nutrition. By addressing the challenges through collaborative efforts and adaptive planning, green spaces can be effectively utilized to improve the overall well-being of communities.

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Studies On Microbial Glutaminases From Unique Sources For Their Anti Tumor Efficacy

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L-glutaminase (L-glutamine amidohydrolase E.C.3.5.1.2) has gained lot of importants in recent years due to its important application in the pharmaceutical industry as an alternative for the treatment of various cancers. L-glutaminase is a unique enzyme with catalytic activity and the ability to modulate glutamine levels, making it a valuable enzyme with numerous potential applications. L-glutaminase triggers a distinctive reaction by converting L-glutamine into glutamic acid while releasing ammonia concurrently. In all five soil samples were subjected for screening of isolates for L-glutaminase production. The isolates were further screened by the plate assay. The confirmation of the strains for L-glutaminase production was carried out by the thin layer chromatography. The best organism chosen after screening was named as JU12. Various agro-industrial waste substrates and their extracts were evaluated for the production of L-glutaminase under submerged fermentation (Smf). Optimization of various process parameters required for maximum L-glutaminase production by JU12 will be carried out. The parameters studied are pH, temperature of incubation, inoculum size, carbon and nitrogen source. Our studies focus on the exploration of newer strains for the production of L-glutaminases, which is a very promising agent in treating some forms of neoplastic cell disease in humans.

Key words: Leukemia, glutaminase, plate assay, thin layer chromatography, Smf.

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Investigations On Microbial Asparaginases From Diverse Sources And Their Applications

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L-asparaginase is an anticancer agent that lowers L-asparagine "which is an important nutrient for tumour cells"that breaks down L-asparagine into L-aspartic acid and ammonia leading to starvation of the cancer cells and apoptosis in susceptible leukemic cells. Hence, the demand for L-asparaginase is expected to surge due to the increase in clinical and industrial applications in various sectors, such as food processing. L-asparaginase is an anticancer agent that is used in the first line treatment of ALL. L-asparaginases from bacterial sources has limitations of lower productivity, stability, selectivity and couple of toxicities and resistance. Hence, the exploration for newer enzyme sources with efficacy against human carcinomas without adverse effects is in progress. Five soil samples were screened for isolates for L-asparaginase production. The isolates were further screened by the plate assay and confirmed for L-asparaginase production by the thin layer chromatography. The best organism chosen after screening was named as JU03. Various agro-industrial waste substrates and their extracts were evaluated for the production of L-asparaginase under submerged fermentation (Smf).

Keywords: Acute lymphoblastic leukemia, asparaginase, plate assay, agro-waste, submerged fermentation.

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Automatic Image And Video Caption Generation With Deep Learning: A Review

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Methodologies that utilize Deep Learning offer great potential for applications that automatically attempt to generate captions or descriptions about images and video frames. Image and video captioning are considered to be intellectually challenging problems in imaging science. The application domains include automatic caption (or description) generation for images and videos for people who suffer from various degrees of visual impairment; the automatic creation of metadata for images and videos (indexing) for use by search engines; general-purpose robot vision systems; and many others. Each of these application domains can positively and significantly impact many other task-specific applications. This article is a review of both image captioning and video captioning methodologies based on deep learning.

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Exploring the Therapeutic Potency of Buchanania lanzan Spreng: A Study on Phytochemicals Quantification, Assessment of Antioxidant Alpha-Amylase Inhibitory Properties

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Buchanania lanzan Spreng Locally known as “Achar,” “Charoli,” and “Chawar,” is a socioeconomically significant plant that has been recognized for its therapeutic usefulness by the IUCN Red Data Book. Tribal communities have long used it for a variety of therapeutic uses. Reactive oxygen species (ROS) are essential, but if their equilibrium is disrupted, they can damage cells. Plants high in antioxidants, such as Buchanania lanzan Spreng, may be able to combat these circumstances by limiting the buildup of ROS. To fully grasp their therapeutic potential against illnesses connected to oxidative stress, it is essential to learn about their phytochemical composition. The total methanolic leaves extract (BLTMLE) of Buchanania lanzan was examined in this work, and its pharmacological and phytochemical properties were assessed. Phytochemical screening identified presence of polyphenols, glycosides, saponins, and steroids in plant extract. The total amounts of phenol, flavonoids, saponins, and carbohydrates in BLTMLE were determined by various estimation assay. BLTMLE demonstrated potent free radical scavenging abilities with an IC50 by DPPH assay compared to standard ascorbic acid with lower IC50 value. As a scavenger, BLTMLE significantly inhibited α-amylase and assisted reduce the hemolysis in RBC cells induced by H2O2. Its phytochemical composition and pharmacological potential were also revealed by Thin Layer Chromatography (TLC) and HR-LCMS analysis, opening up new study and application possibilities.

Keywords: Antioxidants, Haemolysis, Alpha inhibitory assay, DPPH, TLC

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Occupational Stress Of Women Health Care Worker's- Its Impact On Job Performance & Wellbeing

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Background: Occupational stress is a global phenomenon affecting the health care workers and having an impact on their job performance and wellbeing. In India among the 5.76 million health care workers- 29% doctors, 80% nursing staff amount to the total health care working system according to Karan A et al 2021-the availability ratio of health care workers and the population is low that results in occupational stress. More specifically about the women health care workers, the studies are indicative of many factors like, work overload, work experience, conflict at workplace, marital status, educational qualification, job satisfaction, work environment and not rewarded /appreciations are majorly associated with the occupational stress which has major impact on job performance and the wellbeing amongst women health care workers.
Methodology: The data was collected using purposive sampling technique. Sample of 50 women health care workers working in hospital, clinic settings were enrolled for the study. Briefing about the study and consent was sought from women health care workers before they were enrolled to the study by the researcher. The data was collected using google form. The Individual Work Performance Questionnaire by Koopmans,2015, General Health Questionnaire GHQ 12 by Goldberg and The Work Performance Stress Scales.
Results: The results indicate that the majority of the respondents are explicitly aware about their stress and are in the age range of 25-50 years, the productive age of their life. The present study is indicative of occupational stress, its impact on job performance and the well-being of women health care workers. There have been various factors promoting the stress, their job performance and their wellbeing.
Conclusion: To enhance wellbeing, reduce stress and its impact on job performance in women health care workers we need to work towards promoting their work culture, techniques to reduce stress and ensure to promote wellbeing of them.
Keywords: Occupational stress, Job performance & Employee Well being

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Enhancing Medical Diagnosis with Neural Networks: Advancements in Accuracy and Interpretability

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Accurate medical diagnosis is the cornerstone of effective healthcare, driving treatment strategies and significantly improving patient outcomes. The advent of deep learning neural networks has catalyzed a paradigm shift in medical diagnostics, delivering unparalleled accuracy and interpretability.

This paper delves into the transformative capabilities of neural networks in medical diagnosis, leveraging robust datasets sourced from www.ncbi.nlm.nih.gov. Our methodology involves meticulous

data collection, rigorous preprocessing, and the development of customized neural network architectures tailored to critical diseases, including heart disease, kidney disease, diabetes, Parkinson's disease, and breast cancer.

Through extensive experimentation and in-depth analysis, our findings reveal significant advancements in diagnostic accuracy and interpretability, highlighting the profound potential of neural networks to revolutionize clinical practice.

Moreover, a thorough literature review and discussion illuminate the broader implications of these advancements, setting the stage for groundbreaking future research in the domain of precision medicine.

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The role of BMX in cancer stem cell state and ibrutinib sensitivity in pediatric high-grade glioma

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Background: Annually, around 50,000 brain tumors are diagnosed in the United States, with gliomas comprising the majority. High-grade gliomas, including glioblastomas, represent a particularly aggressive subset, accounting for approximately 25% of adult and 15% of pediatric brain tumors. The treatment of high-grade gliomas has seen minimal advancement in recent years due to their complex and heterogeneous nature. A significant component of this heterogeneity is attributed to glioma stem cells (GSCs), which are stem-like, self-renewing, and resistant to conventional therapies. The stem cell state of GSCs is regulated by the BMX-STAT3 signaling axis. Ibrutinib, a known inhibitor of this axis, may offer a potential therapeutic strategy.

Methods: This study utilized patient-derived glioma stem cells for all experimental assays. We employed lentiviral-mediated delivery of shRNAs and overexpression constructs to manipulate gene expression. Cells were treated with varying concentrations of Ibrutinib for 6 days, and cell viability was evaluated using a luminescence-based assay. The self-renewal capacity of the cells was assessed through a limiting dilution assay. BMX and other stem cell markers were quantified using Western blot and qPCR techniques.

Results: Sensitivity to Ibrutinib varied significantly across different patient-derived samples, with a roughly 100-fold difference observed. A strong correlation was found between BMX expression levels and Ibrutinib sensitivity. Pediatric high-grade glioma samples exhibited particularly high sensitivity to Ibrutinib and low BMX expression. Knockdown of BMX in high-expressing cells increased sensitivity to Ibrutinib and reduced self-renewal potential. Additionally, some constructs led to decreased levels of stem cell markers such as SOX2 and OLIG2. We are currently in the process of overexpressing BMX in BMX-low lines to further investigate the relationship between BMX levels and Ibrutinib sensitivity.

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Biopolymeric chitosan-alginate nanogel material for optimized drug delivery of curcumin at gastro-intestinal environment in-vitro

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The chitosan and alginate complex was used to synthesize hydrogel (Chi-Alg-H-gel) and silver nanogel (Chi-Alg-N-gel) systems that serves as the drug carrier for the hydrophobic drug curcumin. The synthesized gels were characterized using several analytical techniques, including field emission-scanning electron microscopy (FE-SEM), Fourier-transform infrared spectroscopy (FTIR), energy-dispersive X-ray spectroscopy (EDAX), and X-ray diffraction (XRD), to elucidate its structural and chemical compositions. The loading efficiency of curcumin on to Chi-Alg-H-gel and Chi-Alg-N-gel was found to be 60 ± 1.5% and 71 ± 2.09%, respectively. Interestingly, the nanogel system had shown a sustained release profile of curcumin, with the drug being released over a period of 7 hours compared with hydrogel release rate. This disparity in release kinetics suggests that the Chi-Alg-N-gel system showed controlled release of curcumin specifically at in-vitro gastric pH (pH 2). Furthermore, curcumin loaded nanogel exhibited excellent antioxidant effect against DPPH free radicals (IC50 42 µg/ml). Also, the toxicity analysis of the synthesized gels were studied on human red blood cells revealing a low hemolysis rates (<1.5%), indicating their biocompatibility and non-toxicity. Overall, this study presents promising results for the development of hydrogel and nanogel systems as an excellent drug carrier for curcumin delivery, particularly at acidic pH conditions, with potential implications for biomedical and chemotherapeutic research.

Keywords: Chitosan-alginate complex, hydrogel, nanogel, drug delivery, antioxidant activity

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Asssessment of groundwater quality : a case study on Arkavati watershed region, Karnataka, India

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This research investigates the suitability of dug well water for drinking in Ramanagara and Bangalore Rural districts, Karnataka India. It uses data collected over ten years (2015-2024) from the Central Ground Water Board (CGWB), Bangalore. The study examines important water quality parameters like pH, electrical conductivity, calcium, magnesium, sodium, potassium, CO3, HCO3, SO4, chloride, fluoride, NO3, total dissolved solids, and total hardness at 23 different sites. The parameters were compared against the standards in BIS 10500:2012 to check the water quality. A Water Quality Index (WQI) was calculated using a Weighted Arithmetic Index method for the parameters. This approach took into account how much each factor mattered. The WQI scores were grouped into five grades: A (excellent, 0-25), B (good, 26-50), C (poor, 51-75), D (very poor, 76-100), and E (unfit for drinking, >100). The study checks how WQI grades change over time for better or worse, and tries to identify the potential causes of the changes. From the findings, most of the stations (above 50%) exhibited a WQI grade C. The probable cause can be due to the regions being agriculture sites for silk culture, and also industrialization. The research underscores the need for effective water management strategies to mitigate the impact of human activities on water quality and promote sustainable agricultural practices in the study area.

Keywords: groundwater quality, water quality index, sustainability, industrialization, water management strategies

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Study of Bioaccumulation of Arsenic in Plants near Hatti Industrial Area Raichur

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The study investigates arsenic contamination in edible plants near the Hatti industrial area in Raichur, Karnataka, highlighting significant environmental and public health concerns. Samples from various locations around the industrial zone were analyzed using Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES). Results showed elevated arsenic levels in plant tissues, with variations among species. The study also examined factors influencing arsenic uptake, including soil properties, plant species, and environmental conditions.

Focusing on pigeon pea plants, an alkaline leaching method was used for extraction, followed by ICP-OES analysis. Observed arsenic concentrations in pigeon pea plants were below toxicity limits but still pose potential health risks if consumed in large quantities. Acute ingestion of arsenic can cause gastrointestinal issues, blood abnormalities, heart problems, and nerve damage, while chronic exposure is linked to skin changes, skin cancer, internal cancers, diabetes, blood pressure issues, reproductive health problems, and cognitive impairment. This research enhances understanding of arsenic bioaccumulation in edible plants and its health implications.

Key words: Bioaccumulation, Alkaline Leaching method, Inductively Coupled Plasma Optical Emission Spectroscopy, Arsenic Uptake, Pigeon Pea plants, Gastrointestinal Irritation, Chronic Exposure

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Enhancing Railway Safety and Efficiency: Advanced Object and Signal Detection Using Cameras and Sensors

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This paper explores the integration of advanced camera and sensor technologies for object and signal detection on railway tracks, aiming to enhance safety and operational efficiency. The study reviews the functionalities and applications of high-resolution cameras, infrared cameras, LIDAR, ultrasonic, and infrared sensors in monitoring and analyzing the railway environment. By leveraging machine vision algorithms and real-time data processing, the system offers comprehensive monitoring capabilities, including obstacle detection, signal compliance, and track maintenance. The research highlights the advantages of integrating these technologies to improve the accuracy of detection and response times, addressing challenges such as environmental conditions and data overload. Future trends, including advancements in artificial intelligence and autonomous systems, are also discussed, emphasizing their potential to further revolutionize railway safety and efficiency.

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Interactions between gut microbiome and gut protein receptors: Implications for genomic studies and health outcomes

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The gut microbiome, comprising a wide range of bacteria, viruses, and fungi, plays a vital role in maintaining human health. Its composition is influenced by factors such as diet, environment, and genetics, which in turn affect the microbiomes functions in digestion, immune regulation, and metabolism. The core of these functions is the production of metabolites and signalling molecules that interact with protein receptors in the gut. These receptors, including G-protein-coupled receptors (GPCRs) and toll-like receptors (TLRs), regulate gut physiology, such as motility, secretion, and barrier integrity. The interactions between gut microbial metabolites, such as short-chain fatty acids and bile acids, and these receptors are crucial in modulating immune responses, nutrient absorption, and host metabolism. Understanding these complex interactions is essential for advancing genomic studies, as they reveal critical gene-environment interactions and epigenetic modifications mediated by the gut microbiota. By integrating microbiome and genomic data, we can explore microbiome-receptor interactions through genome-wide association studies and multi-omics approaches, making the way for personalized medicine. These insights have profound implications for health outcomes, particularly in chronic diseases like obesity, diabetes, and inflammatory bowel disease (IBD), as well as mental health disorders. Therapeutic interventions, including probiotics, prebiotics, and receptor-targeting drugs, hold promise for modulating these interactions. Future research directions focus on translating these findings into clinical practice, offering potential for targeted therapies and personalized interventions that improve health outcomes.
Key words: Gut microbiome, G-Protein-coupled receptors, Toll-like receptors, Personalized medicine

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Examination of bioactivity studies of phosphate-based glasses

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Bioactive glasses are a type of biomaterials that have applications in the field of bone tissue engineering and regeneration. Phosphate based glass sample were prepared by traditional melt quench method and were subjected to in-vitro bioactivity studies by immersing in Simulated Body Fluid (SBF) solution with pH=7.4 at 37 ◦C. In-vitro study of bioactivity of phosphate-based glasses involves examining the interaction between the glass material and biological systems, such as cells or tissues. The glass samples after immersion in SBF were evaluated using X-ray Diffraction (XRD), Fourier Transform Infrared (FTIR), and Scanning Electron Microscope (SEM) analyses. The formation of hydroxyapatite layer on the surface of glass sample post-immersion in SBF was confirmed by XRD and FTIR spectra. SEM micrographs show the formation of crystal agglomerates on the surface of glasses. The results of these studies can give valuable insights into the bioactivity of the glasses and their potential applications in the fields of bone tissue engineering and regeneration.

Key words: Bioactive glasses; bone tissue; phosphate-based glasses; SBF; XRD; FTIR; SEM

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A review on- Critical Assessment of Economic Feasibility and Environmental Benefits in Large-Scale Utilization of Bamboo Leaves Ash in Sustainable Concrete Production

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This research examines the economic feasibility and potential environmental benefits of large-scale utilization of bamboo leaves ash (BLA) as a partial replacement for cement in sustainable concrete production. The study aims to address the dual challenges of high carbon emissions from cement production and the effective management of agricultural waste. The importance of this research lies in demonstrating how BLA can serve as a cost-effective and environmentally friendly alternative to traditional cement, promoting sustainable construction practices.
Methods involved a comprehensive economic analysis of BLA production, including costs associated with collection, processing, and transportation, compared to conventional cement. Additionally, an environmental impact assessment was conducted to evaluate the reduction in carbon emissions, energy consumption, and waste management benefits associated with large-scale BLA utilization. Concrete mixes incorporating varying percentages of BLA (0%, 10%, 15%, 20%) were tested for mechanical properties to ensure their viability for construction purposes.
Results indicated that BLA can be produced and utilized at a lower cost than traditional cement, primarily due to the availability and low cost of raw bamboo leaves. The environmental impact assessment revealed significant reductions in carbon emissions and energy consumption, with up to 20% BLA replacement. The mechanical testing showed that concrete with up to 15% BLA replacement maintained adequate strength and durability, making it suitable for various construction applications.
The implications of these findings suggest that large-scale BLA utilization can offer substantial economic and environmental benefits, facilitating its adoption in the construction industry. Future research should focus on optimizing the logistics of BLA production and distribution, conducting long-term performance studies of BLA concrete, and exploring policy measures to encourage the use of agricultural waste in construction. Additionally, developing standardized guidelines for BLA processing and utilization will be essential for its widespread adoption.

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Short Circuit Analysis of Trench Gate Silicon Carbide MOSFET

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This paper presents an in-depth analysis of the short-circuit behavior of 600V Trench Gate Silicon Carbide (SiC) MOSFETs using TCAD software Silvaco, which are increasingly utilized in high-power and high-temperature applications due to their superior material properties. The unique trench gate structure of SiC MOSFETs contributes to enhanced electric field distribution, lower on-resistance, and improved breakdown voltage, making them particularly resilient in extreme operating conditions. However, under short-circuit scenarios, these devices are subjected to rapid current surges and significant thermal stress, which can lead to potential failure if not properly managed. In order to combat this issue, a p-layer has been incorporated in the drift region. It has been found that

short circuit time has been increased from the 3us to 12 us while restraining the current to below 10%. The study also discusses potential mitigation strategies, including gate drive optimization and thermal management techniques, to enhance the reliability and performance of SiC MOSFETs in demanding power electronics applications. Through this investigation, the findings aim to contribute to the design of more resilient SiC-based power devices, ensuring their safe operation in high-stress environments.

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Evaluation of Antiherbivoral, and Antibiofilm Activities in Trichomes of Coleus amboinicus and Solanum lycopersicum.

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This study undertakes evaluation of the antiherbivoral, and Antibiofilm activities exhibited by trichomes in Coleus amboinicus and Solanum lycopersicum .This employs a combination of in vitro and in vivo assays to investigate the chemical composition of trichome secretions from Coleus amboinicus (Indian borage) and Solanum lycopersicum (tomato). The research focuses on evaluating the effectiveness of these secretions in inhibiting deterring herbivores, and preventing biofilm formation. The aqueous extract and methanolic extract was used for preliminary analysis of metabolites .HPLC of the samples analysed a number of secondary metabolites such as terpenoids, phenolics, alkaloids, cyanogenic glycosides and gossypol Antiherbivoral effects are assessed using herbivorous insects like Drosophila melanogaster in controlled environments. Additionally, the antibiofilm properties are examined against common bacterial strains like Bacillus species and Staphylococcus species known for biofilm formation. The result demonstrated positive Antiherbivoral and Antibiofilm activity.

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Comparative Studies On Extraction Techniques Of Virgin Coconut Oil For Selected Varieties

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Coconut oil (Cocos nucifera L.) has an essential functional role in the diet. For ages, many regions of the globe have recognised the health and nutritional benefits of coconut oil use. This study compares the extraction techniques of virgin coconut oil for Tiptur Tall and Hybrid varieties. The research findings is to determine whether there are significant differences in the yield recovery and physiochemical parameters such as specific gravity, viscosity, acid value, FFA, peroxide value, iodine value, saponification value, antioxidant activity and triglyceride for hot extracted virgin coconut oil (HEVCO), cold extracted virgin coconut oil (CEVCO), and market sample (MS) were analysed. Among the physicochemical parameters investigated, there was a significant difference ($p \leq 0.05$) for the peroxide value, iodine value, saponification value, antioxidant activity and triglyceride of VCO extracted using various procedures of Tiptur Tall and iodine value, saponification value, antioxidant activity and triglyceride of VCO extracted using various procedures of hybrid when compared to market sample although other properties of Tiptur Tall and Hybrid of VCO extracted using various

procedures did not change substantially across samples. The main findings indicate that the hybrid variety produces a higher yield of oil about 21.42% than the Tiptur tall variety, regardless of the extraction method used. The conclusions drawn from this study are that the cold extracted virgin coconut oil (CEVCO) for hybrid variety produced the highest yield of comparing with other extraction methods and the triglyceride was found to be about 47.67±0.03% high in Cold extracted Virgin Coconut oil for hybrid variety.
Keywords: Virgin Coconut Oil, Tiptur Tall, Hybrid, Hot Extraction, Cold Extraction, Triglyceride

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X-Material Sandwiched Between Absorber/Gold Contact for Nanowall-Based Solar Cell

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Nanostructure technique is most significant in photovoltaics for providing advanced sustainable energy solution. The unique three-dimensional (3D) nanowall architecture offers better surface area-to-volume ratio, improving light absorption and charge carrier collection compared to traditional flat-plate designs. Besides these advantages, maximizing performance in the longer wavelength range remains a challenge. To address this, the paper under consideration evaluates the performance improvement of CdS/CdTe nanowall-based solar cells, focusing on their efficiency in the longer wavelength range by incorporating various materials, including Lead Telluride (PbTe), Lead Sulfide (PbS), Germanium Telluride (GeTe), Molybdenum Ditelluride ($MoTe_2$), Copper Telluride (Cu_2Te), and Tin Telluride (SnTe), at the CdTe/gold interface. TCAD software Silvaco have been employed to analyse the impact on electrical performance of the device. A detailed analysis reveals that $MoTe_2$ provides the best balance between internal quantum efficiency (IQE) and essential photovoltaic parameters. This study also reveals that integrating these materials can significantly affect the electronic band alignments and charge carrier transport, optimizing the band offsets and enhancing the power utilization in the longer wavelength range. The findings offer valuable insights into material selection for improving overall efficiency, guiding future developments in semiconductor devices and renewable energy technologies.

Keywords: Photovoltaics; TCAD Silvaco; CdS/CdTe Solar Cells; Molybdenum Ditelluride; Nanowall Solar Cells

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Application Of Artificial Intelligence

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Artificial intelligence (AI) is one of the emerging trends in the recent world which makes man's work simpler and less time consuming. This AI which emerged can not only rule the world of information technology but can be implemented in food industries as well, where the AI can be used to detect the quality of food manufactured. The food sector has been using AI progressively for years for various

purposes, including quality control, food safety, classification and parameter prediction, and sorting of food. Adaptive neural-fuzzy inference systems (ANFIS), fuzzy logic, machine learning, ANN, expert systems, and fuzzy logic are a few widely used approaches in the food industries. When AI is used in place of a labor force, the task becomes easier because it closely monitors each step without causing repetitive errors every time. Automated systems are capable of gathering hundreds of data points about just one food item in a matter of seconds and providing a quick evaluation of it For instance, a system can swiftly move hundreds of different ingredients along a conveyor belt while gathering and processing data from each one; these systems can drastically cut waste and labor expenses. The application of AI in the food sector has been ongoing for decades, and many benefits are associated with it, have been growing up to the present moment.
Keywords: Information technology, AI (Artificial intelligence), emerging trends, food service sector, profitability), Artificial Neuro Network (ANN), Adaptive neural-fuzzy inference system (ANFIS),

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Characterization and Antibiotic Resistance Profiling of Extended Spectrum Beta- Lactamases (ESBL) Producing Bacteria in Clinical settings

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The emergence of extended-spectrum beta-lactamase (ESBL) producing bacteria poses significant challenges in clinical settings, necessitating robust surveillance and characterization strategies. This study aimed to collect clinical specimens from a medical college and evaluate a diverse array of bacterial isolates. A total of 30 isolates were obtained, followed by comprehensive biochemical testing and morphological analyses to characterize the strains. The antibiotic resistance profile was assessed through standard disk diffusion methods, specifically focusing on ESBL production across various antibiotics, including cefotaxime, ceftazidime, and others in the beta-lactam class. Our findings reveal a concerning prevalence of ESBL producers within the sampled isolates, with notable resistance patterns that underscore the need for continuous monitoring and antibiotic stewardship. This research not only contributes to the understanding of resistance mechanisms in clinical isolates but also emphasizes the importance of targeted therapeutic strategies to combat the challenge of antibiotic resistance in healthcare settings. The results underscore the critical need for enhanced infection control measures and refined antibiotic use policies to mitigate the impact of ESBL-producing organisms in medical environments.

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Production, characterization and anticancerous activity of L-asparaginase from Bacillus sp

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L-Asparaginase, a crucial enzyme for treating Acute Lymphoblastic Leukemia (ALL), was explored for its production and anticancer efficacy from soil-dwelling microbes. Soil samples were screened, and L-Asparaginase-producing strains were isolated and identified using standard microbiological

techniques. Optimization of enzyme production involved adjusting physical parameters with optimal results at pH 8, a temperature of 40℃ and 48hrs incubation time, as well as evaluating the effects of various chemical sources. Purification was achieved through chromatographic methods, and the enzyme was characterized for its stability and activity under different conditions. SDS-PAGE was employed to determine its molecular weight which was found to be 45kDa. The enzyme exhibited notable anticancer activity in assays, indicating its potential for therapeutic applications. This study demonstrates the feasibility of utilizing soil microbes as a sustainable source for high-quality L-Asparaginase, offering valuable insights for advancing cancer treatment

Keywords –L-asparaginase, Bacillus sp, Purification, chromatographic technique characterization, anti-cancerous activity, SDS page

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Harnessing the power of bioactive mushrooms; Innovations in Anticancer Diagnostic and Therapeutic benefits

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Mushrooms, particularly those rich in bioactive compounds, have garnered significant interest in both diagnostic and therapeutic fields due to their notable antimicrobial and anticancer properties. Recent studies have highlighted the antimicrobial efficacy of various edible mushroom extracts, which have demonstrated substantial activity against a range of bacterial and fungal pathogens. In addition to their antimicrobial capabilities, mushrooms are being explored for their anticancer properties. Research has identified several bioactive compounds within mushrooms that may inhibit tumor growth and enhance immune responses by modulating critical signaling pathways involved in cancer progression, such as the PI3K pathway. This growing body of evidence underscores the importance of mushrooms in developing novel therapeutic strategies for cancer treatment. The TaqMan assays, represents a significant advancement over traditional methods for detecting bacterial blotch in mushroom cultivation. These assays provide high specificity, sensitivity, and speed, allowing for the rapid quantification and differentiation of pathogens, which is crucial for effective disease management in economically important mushroom species. Furthermore, the unique properties of mushroom mycelium have inspired the development of sustainable biomimetic materials, offering alternatives to non-biodegradable products. The extraction and characterization of polysaccharides from wild mushrooms reveal a wide array of biological activities, including immunomodulatory and antioxidant effects. These polysaccharides can be extracted using various methods, and advanced analytical techniques are employed to characterize their molecular properties. Overall, the multifaceted applications of mushrooms in diagnostics and therapeutics highlight their potential as valuable resources in clinical settings and sustainable material development.

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Efficient utilization of papaya waste using novel technologies for extraction of oil and bioactive compounds

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The study delves into the efficient utilization of papaya waste through innovative extraction technologies to extract oil and bioactive compounds. Various methods such as Ultrasound- Assisted Extraction (UAE) and Microwave Ultrasound-Assisted Extraction (MUAE) were employed to extract valuable compounds from papaya seeds. This underscores the significant potential of papaya seed oil, known for its high oleic acid content, making it suitable for a wide range of industrial applications. Quality assessments conducted on the extracted oils indicate that they maintain high standards. The study emphasizes the sustainable utilization of papaya waste for the extraction of valuable products, offering both environmental conservation benefits and economic advantages. By exploring novel extraction techniques, this research contributes to the advancement of sustainable practices in utilizing agricultural byproducts like papaya waste, providing valuable insights for the food and pharmaceutical industries. The papaya pomace was found to have moisture (0.28%), ash (5.27%), protein (55.43 mg), fiber (13.34 mg), and Carbohydrate (25.46%) are obtained. These results shed light on the nutritional composition of papaya waste, showcasing its potential as a source of essential nutrients and bioactive compounds. The quality assessments conducted on the extracted oils serve as a testament to the efficacy of the extraction methods employed, ensuring that the extracted products meet stringent quality standards. This study not only underscores the importance of sustainable practices in utilizing agricultural byproducts but also underscores the economic and environmental benefits of harnessing the potential of papaya waste for valuable product extraction.

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Isolation of yeast from forest soil and anti-bacterial activity of synthesized yeast-based nanoparticles.

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This study investigates the isolation of yeast strains from forest soil and their application in nanobiotechnology. Multiple yeast species were successfully isolated using selective media, and molecular characterization, including sequencing of the internal transcribed spacer (ITS) region, identified three isolates. Two were found to be the pathogenic *Candida parapsilosis*, while the third was *Pichia cactophila*. Due to its pathogenic nature, *Candida parapsilosis* was excluded from further studies, and *Pichia cactophila* was selected for nanoparticle synthesis.

We synthesized silver nanoparticles (AgNPs) using *Pichia cactophila* and silver nitrate as a precursor. The formation of AgNPs was confirmed by UV-Vis spectroscopy, which showed a characteristic surface plasmon resonance peak. The antibacterial efficacy of these yeast-derived AgNPs was evaluated using well diffusion assays against *Staphylococcus aureus* and *Escherichia coli*, demonstrating significant antibacterial activity.

This research highlights the potential of environmental yeast strains, particularly *Pichia cactophila*, in the biogenic synthesis of nanoparticles. Our findings provide insights into the development of novel antimicrobial therapies through environmentally sourced microorganisms, offering a promising approach to nanomedicine.

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Evaluation of bacterial isolates with bioremediation potential for plant growth promotion traits in millets.

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Plant Growth-Promoting Rhizobacteria (PGPR) are useful in suppressing plant diseases and promoting growth and development. The aim of the present study is to evaluate potent textile dye degrading isolates for PGPR traits. The main aim of this research is to attempt enhancing the yield of millets by using the growth promotion property of the isolates. A total of four isolates with good dye degradation ability were evaluated for PGPR traits and were characterised using biochemical tests and molecular techniques. The isolates were tested for traits such as Indole production, Phosphate solubilization, Zinc solubilization, HCN production, Ammonia production and Siderophore production and the isolates represented as S1, G1, MB and DR answered positive for most of the PGPR properties. Antifungal activity was also checked and S1, G1 and MB possessed good antagonistic property against *Aspergillus* sp. and MB exhibited a maximum percentage inhibition of 74.75%. In vitro seed germination assay was performed for the millets Jowar, Bajra and Ragi and maximum root and shoot length was recorded with MB treatment. Preliminary Pot culture assay was performed. Isolate MB showed maximum seed germination in comparison to the other two isolates (G1 & DR).

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Short Circuit Analysis of Trench Gate Silicon Carbide MOSFET

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This paper presents an in-depth analysis of the short-circuit behavior of 600V Trench Gate Silicon Carbide (SiC) MOSFETs using TCAD software Silvaco, which are increasingly utilized in high-power and high-temperature applications due to their superior material properties. The unique trench gate structure of SiC MOSFETs contributes to enhanced electric field distribution, lower on-resistance, and improved breakdown voltage, making them particularly resilient in extreme operating conditions. However, under short-circuit scenarios, these devices are subjected to rapid current surges and significant thermal stress, which can lead to potential failure if not properly managed. In order to combat this issue, a p-layer has been incorporated in the drift region. It has been found that short circuit time has been increased from 3us to 12us while restraining the current to below 10%. The study also discusses potential mitigation strategies, including gate drive optimization and thermal management techniques, to enhance the reliability and performance of SiC MOSFETs in demanding power electronics applications. Through this investigation, the findings aim to contribute to the design of more resilient SiC-based power devices, ensuring their safe operation in high-stress environments.

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Liquid Chromatography Mass Spectrometry and High performance liquid chromatography with fluorescence detection of aflatoxins from bakery food products

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Aflatoxins are a group of toxic compounds produced by certain molds, particularly *Aspergillus flavus* and *Aspergillus parasiticus*. These molds are found on bakery food products. Aflatoxins are known for their potential to contaminate food supplies, leading to serious health risks. This study aimed to assess the occurrence of toxigenic fungi and mycotoxin contamination in bakery food products using advanced molecular and analytical techniques. TLC, was established for rapid identification of mycotoxigenic fungi, and an improved analytical method was developed simultaneous multi-mycotoxin determination in bakery food products by LC-MS and HPLC technique. The method was applied for evaluation of 83 samples collected from rural areas for the presence of mycotoxin producing fungi, and a few samples were found positive for *Fusarium*, *Penicillium sp*, *A.flavus* and *A.parasiticus*. Further analysis revealed that 25 samples contained mycotoxins above the level of detection, but 19 isolates showed positive results for mycotoxins from 25 different bakery food products. The results showed a strong correlation between the presence of mycotoxin biosynthesis genes as analysed by LC-MS and HPLC technique. The present findings indicate that a combined approach might provide rapid, accurate and sensitive detection of mycotoxigenic species and mycotoxins in bakery food products.

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Extraction Of Natural Coloured Pigments From Amaranthus (Amaranthus Cruentus) Leaves And Its Application In Food Product

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The food industry is embracing the formulation of natural colour based products to cater to the rising demand for nutritious and eco-friendly food colour options instead of artificial colour. Natural colour have a smaller environmental footprint. In this study, we explore the extracting natural-colored pigments from Amaranthus (Amaranthus cruentus) leaves and their application in food products. We focus on Utilizing Amaranthus cruentus pigments for enhancing ice cream aesthetics. Our objective is to Extract natural colour pigments, characterize with UV and FTIR, then incorporate into ice cream for enhanced color and flavor. We have used soaking extraction method and microwave assisted extraction method with different solvent such as Distilled water, Ethanol and Acetone for extracting the natural color pigments from Amaranthus cruentus leaves and incorporate into Ice-cream. The optimization of natural coloured based ice- cream was achieved through the application of sensory evaluation by using the 9-Point Hedonic Scale. Results revealed that the flavored and unflavored values are ranging from 5.5 to 8.5 for response mean for colour, texture, flavour, test and overall acceptability. The Ice cream exhibited a proximate composition indicated total sugar content of 8.43±0.2%, and added sugar content of 6.87±0.01%, Total Fat 11.89±0.2% and sucrose 6.87 ±0.2%. The melting rate of ice cream was determined to be approximately 30℃. The Ice cream shows colour difference (ΔE) value for different extract for Distilled water and ethanol were ΔEDW-E ≈ 0.224 ±0.05, Ethanol and Acetone ΔEE-A≈ 0.319±0.05 and Acetone and distilled water was ΔEA-DW ≈ 0.1005±0.05. The overrun percentage was 32.0% by considering the weight of the mix and the weight of the ice cream. Overall, this study provides valuable insights into the composition and characteristics of natural colour based ice cream, showcasing its potential as a health beneficial and flavorful food colour option, contributing to the development and acceptance of natural colour based products in the food industry, and offering alternative choices for health conscious consumers

Keywords: *Amaranthus, Extraction, Ice cream, Natural pigment, Sensory.*

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Exploring the Antibiotic-Producing Potential of Marine Actinomycetes: A Focus on Optimization and Kirby Bauer's Methodology

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Discovery of various antibiotics from marine actinomycetes has gained attention from pharmacologists and drug industries. Marine regions like mangroves, estuaries are not extensively explored for isolation and screening of antibiotics from actinomycetes. The emergence of ESBL- producing pathogens necessitates continuous search for novel antibiotics. In the present work, actinomycetes was isolated from mangroves, estuaries and sediment samples. The isolates were characterized and screened for antimicrobial agents. Preliminary screening of isolates was performed against ESBL-producing pathogens. Extraction and purification of the antimicrobial agent was done for the secondary screening. A comparative analysis on antibiotic production in both crude and ethyl acetate extract was studied by well diffusion method against ESBL-producing organisms. Optimization of the antimicrobial agents in various conditions to enhance their production was carried out. Antibiotic sensitivity test by Kirby Bauer's method was performed to understand the probable categories of the compounds produced by the isolates. Further work includes the identification and analysis of the antimicrobial agent produced by the isolates through various techniques. The actinomycetes and its antibiotics may have greater application against various multi-drug resistance pathogens.

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Enhancing Semantic Parsing with Graph Neural Networks: Improving Natural Language to Formal Representation Mapping

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Semantic parsing, the task of mapping natural language text to formal representations, can benefit greatly from advanced neural network architectures. Graph Neural Networks (GNNs) offer a promising approach by modeling text as complex graphs, where nodes represent linguistic elements and edges denote their semantic and syntactic relationships. Inspired by the work of Malekzadeh et al. (2021) on GNNs for text classification, this study explores how GNNs can be adapted to enhance semantic parsing. Conventional parsing methods often struggle with capturing the nuanced dependencies within text due to their linear or shallow nature. This research introduces a novel application of GNNs to represent and process text in a graph-based format, integrating sophisticated models and contextual information to improve parsing accuracy. Through rigorous evaluation on standard benchmarks, the proposed method demonstrates significant advancements over traditional techniques, offering a fresh perspective on leveraging GNNs to tackle the complexities of semantic parsing.

Keywords: Semantic Parsing, Graph Neural Networks, GNNs, Natural Language Processing, Formal Representations, Graph-Based Models, Deep Learning, Text Graphs, Syntactic Relationships, Semantic Relationships, Benchmark Evaluation.

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Effective Mosquito Control from Bacillus thuringiensis, supports public health, environmental sustainability, and improved quality of life

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The term "Mosquitocides," which most likely refers to a method for managing mosquito populations, has many connections to India's Sustainable Development Goals (SDGs): SDG 3: Well-being and Good Health. SDG 6: Clean Water and Sanitation. SDG 11: It improves urban environments' health and the standard of living in cities. SDG 15: Life on Land. A toxin produced by the Bacillus thuringiensis (Bt) cry2 gene is particularly efficient against mosquitoes and other members of the order Diptera. This gene produces a protein that targets and damages these insects' gastrointestinal cells, causing them to perish. Cry2 protein specificity makes it especially helpful in regulating illnesses like malaria and dengue fever that are spread by mosquito populations. This specialization promotes environmentally friendly pest management techniques by minimizing non-target impacts on beneficial insects. cry2 genes were confirmed by PCR using cry 2 gene-specific primer and larvicidal assay methods, which indicated that Bt strains contained Diptera-specific Cry protein and reflected on their insecticidal activity.

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The Effect of Betel Leaf (Piper betle) on Asthma

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Asthma, a chronic inflammatory condition of the airways, is managed primarily through the use of bronchodilators and anti-inflammatory drugs. However, traditional herbal remedies, such as betel leaf (Piper betle), have been explored for their potential therapeutic effects in asthma management. This review synthesizes current research on the pharmacological properties of betel leaf, focusing on its anti-inflammatory, antioxidant, and bronchodilatory effects, and evaluates its potential role as a complementary treatment for asthma.

Keywords:- Betel leaf, Piper betle, Asthma, Anti-inflammatory, Antioxidant, Bronchodilator.Methods (Ethanol extraction of betel leaves)

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Optimization of culture (media standardization and strain improvement) conditions for maximum Cellulase production by Trichoderma

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Cellulase is a complex enzyme consisting of endoglucanase, exo-glucanase, and beta-glucosidase those together act to hydrolyze cellulose into glucose units. The enzyme is produced by various microorganisms. Fungal cellulase are popular than bacterial cellulase. Aspergillus and Trichoderma are the most important fungi cellulase producers under solid-state fermentation (SSF) due to their high enzyme productivity. Among these, Trichoderma stands out as a widely utilized organism capable of generating substantial amounts of cellulase and hemi-cellulase, crucial for lignocellulose degradation. Since the enzyme can breakdown the lignocellulosic biomass, second generation biofuels such as bioethanol can be produced. Trichoderma has expanded from classical mutagenesis to cutting-edge molecular biology, fuelled by global crises like oil shortages and the growing demand for bio-based solutions. Today, Trichoderma stands at the forefront of enzyme production, contributing to a diverse array of industrial applications. The aim of the study is to produce cellulase enzyme from Trichoderma using agricultural wastes and market effluents as precursors and also to improve the strain and optimize the physiochemical parameters for maximum enzyme production.

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GaN-HEMT Device Response to Photon Exposure

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Gallium Nitride High Electron Mobility Transistors (GaN-HEMTs) are crucial for high-power and high-frequency applications due to their exceptional material properties. This study explores the effects of photon irradiation on GaN-HEMTs, focusing on alterations in their electrical characteristics. Photon irradiation has been performed using an Elekta Synergy Medical Linear Accelerator, delivering 20 Gy of 15 MeV bremsstrahlung photons in 3 minutes on GaN-HEMT device. Electrical characterization has been conducted at the BD-6 power station using multi-probes connected to the gate, drain, and source of both irradiated and unirradiated devices. The study assessed the drain-to-source current as a function of gate-to-source voltage for drain voltages of 1V, 2V, 3V, and 4V. Results indicate that photon irradiation increases the drain current (Ids) across all gate voltages (Vgs) for a given drain voltage (Vds), suggesting that photon exposure introduces additional charge carriers into the device channel, thereby enhancing conductivity. Additionally, a slight shift in threshold voltage (Vth) has been observed, implying modifications in interface or bulk trap densities. The increase in Ids has been more significant at higher drain voltages.

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Transforming agriculture; The role of hydrogel in cultivating a greener and more sustainable future

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Abstract:
Hydrogels have become a revolutionary innovation in farming, tackling major issues like lack of water, declining soil health, and wasteful use of fertilizers. These incredibly absorbent materials can hold up to 1000 times their weight in water, greatly increasing soil water levels and cutting down on the need for watering, especially in dry and partly dry areas. Moreover, hydrogels make the soil better, reduce the rate at which water evaporates, and help nutrients be released in a controlled manner, which in turn reduces environmental harm and boosts the growth of crops. Recent findings show that hydrogels not only enhance plant development and harvest by keeping the soil at just the right moisture and nutrient balance but also support farming methods that are better for the environment by reducing dependence on resources that are not renewable. However, there are still concerns, including their natural decomposition, cost, decreasing effectiveness over time, and potential effects on soil acidity and water drainage. This overview brings together the latest studies on how hydrogels are used, what advantages they bring, and what challenges they face, emphasizing their role in making global food production more secure and supporting sustainable agricultural techniques Looking forward, research should aim to develop sustainable and affordable hydrogels and evaluate their long-term environmental impact to maximize their effectiveness in various agricultural applications.

Keywords: Hydrogels, Absorbent, Agriculture, Sustainable agriculture, Soil health, Environmental health, Soil improvement

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Impact of 10 Ci-Neutron Irradiation on GaN-HEMT Devices

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This study explores the effects of neutron irradiation on Gallium Nitride High-Electron-Mobility Transistors (GaN-HEMTs) in environments with high neutron flux, such as those encountered in space and particle accelerators. GaN-HEMT devices were irradiated using a 10 Ci Americium Beryllium (AmBe) source, generating a neutron spectrum ranging from thermal energies to 9.8 MeV, thereby simulating neutron-rich conditions. The devices were exposed to a neutron flux of 2.2 × 10ˆ6ncm−2Sˆ−1 for 168 hr. Following irradiation, γ-spectroscopy was utilized to assess induced radioactivity, and electrical characterization focused on IV characteristics. The subsequent changes in electrical properties have been systematically analyzed, offering crucial insights into the durability of GaN-HEMTs under extreme conditions and contributing to a deeper understanding of the mechanisms behind performance degradation in neutron-rich environments.

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Temperature Effects on the Electrical Performance of Nanowall Solar Cells

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Nanostructured solar cells and nanowall-based solar cells are crucial advancements in photovoltaics, but understanding temperature impacts is essential for optimizing efficiency, stability, and commercial viability. The paper under consideration investigates the effect of temperature on the efficiency and operational characteristics of nanowall-based CdS/CdTe solar cells using TCAD software Silvaco. The temperature has been varied from 300 K to 350 K, comparing key photovoltaic parameters such as short-circuit current density (Jsc), open-circuit voltage (Voc), fill factor (FF), efficiency (Eff), series resistance (Rs) and shunt resistance (Rsh). It has been observed that as the temperature is increased, there is a slight decrease in Jsc by approximately 0.5 %. Similarly, Voc shows a more significant decline of 10.72 %, FF remains relatively stable with a minor reduction of 0.47 %, indicating minimal impact of temperature on this parameter within the studied range. However, the overall efficiency of the solar cells decreases by 4.82 %, which can be attributed to the reduction in Voc and Jsc. The most notable change is observed in the shunt resistance (Rsh), which decreases by approximately 21.43 %, indicating increased leakage currents at higher temperatures. Conversely, the series resistance (Rs) shows a substantial increase of about 102.81 %, suggesting a significant impact of temperature on the cell's internal resistance. These findings highlight the critical role of temperature management in optimizing the performance of nanowall-based solar cells. The observed degradation in key performance parameters with increasing temperature underscores the need for effective thermal management strategies to maintain high efficiency and reliability in photovoltaic applications.

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Use of Tellurium glasses doped with Sm2O3 as lower-cost alternative for Germanium glasses used in IR window applications.

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Glasses with infrared (IR) transparency are extremely useful for the applications in thermal imaging and spectroscopy. Tellurium glasses doped with Sm2O3 with a molecular composition of xLi2O-(80-x)B2O3-19.5TeO2-0.5Sm2O3 (x = 30, 35, 40, 45 and 50 mol%) have been synthesized using melt-quenching technique. X-ray diffraction (XRD) analysis of these samples shows the absence of sharp peaks, confirming their amorphous nature. Interestingly, the density of these samples decreases by 3% with the addition of 20mol% of Li2O against B2O3, while the molar volume also decreases. This suggests that the modified structural units are becoming more compact. Fourier Transform Infrared (FT-IR) spectra of the samples clearly indicate the presence of borate structural units, and the glasses are transparent to IR radiation above a wavenumber of 1500 cm-1. These findings suggest that this glass system is well suited for thermal imaging and spectroscopic applications. Additionally, it provides a more cost-effective alternative to germanium glasses, which are currently used in IR window applications.
Key words: Melt quenching, XRD, Amorphous nature, Germanium glass, IR window.

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Alpha Irradiation Effects on GS0650302L GaN-HEMT Performance

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The paper focuses on the impact of alpha irradiation on the GS0650302L GaN-HEMT device, crucial for high-power, high-frequency applications in radiation-rich environments like space missions. The device has been subjected to a 45 MeV alpha beam using the VECC K-130 Cyclotron, simulating space radiation conditions with a dose of 179 Gy. Post-irradiation analysis revealed significant radiation damage mechanisms, including atomic dislocations and nuclear reactions. Notably, the α-irradiated device exhibited improved electrical performance at lower gate voltages but degraded performance at higher voltages. These results emphasize the need for further research on enhancing the radiation resistance and long-term stability of GaN-HEMT devices for optimal performance in space environments.

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Microalgae: "A Sustainable Solution for Producing Biobased Products"

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In the face of the significant environmental challenges posed by fossil fuels, microalgae have emerged as a promising and sustainable alternative. These photosynthetic organisms convert sunlight and atmospheric carbon dioxide into a variety of biomolecules that can be transformed into valuable products like biodiesel and bioplastics. Key factors in the commercial production of these biobased products include biomass, lipid content, and polyhydroxyalkanoate (PHA) levels in microalgae. This study aimed to identify a microalgal isolate with high lipid and PHA content by screening 20 freshwater microalgal isolates. The screening process evaluated growth kinetics, biomass concentration, and the fuel properties of extracted lipids and PHAs, which were chemically characterized using FTIR. The most prevalent fatty acids identified were palmitic, palmitoleic, oleic, linoleic, and linolenic acids. Among the isolates, S1 and S2 exhibited higher lipid productivity, while S6 had a higher lipid content. However, isolate S8 demonstrated an optimal balance of lipid and PHA content along with a high concentration of saturated and monounsaturated fatty acids. The significant presence of neutral lipids in S8 suggests it is a promising candidate for sustainable biodiesel and bioplastic production.

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CRISPR: A Revolution of genome-editing technology

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Programmable DNA nucleases like zinc finger nucleases (ZFNs) and transcription activator-like effector nucleases (TALENs) have significantly advanced the field of genome engineering. However, the CRISPR-Cas system, a newer genome-editing method, has gained widespread prominence due to its simplicity, efficiency, and ease of design. First identified by Yoshizumi Ishino during bacterial studies, CRISPR-Cas functions as part of bacteria's adaptive immune system, using the Cas9 enzyme and guide RNA to target and cleave specific DNA sequences. CRISPR-Cas is classified into Class I and Class II, with various subtypes under each class. In biotechnology, Class II, especially types II and V, are particularly valued. The key gene in Class II is Cas9, composed of the recognition (REC) lobe and the nuclease (NUC) lobe. The NUC lobe includes the RuvC, HNH, and Protospacer Adjacent Motif (PAM) interaction domains. Nobel laureates Jennifer Doudna and Emmanuelle Charpentier refined Cas9 into a simpler two-component system by combining two RNA molecules into a single-guide RNA, which, when paired with Cas9, can accurately locate and cut DNA as specified by the guide RNA.CRISPR delivery methods include Physical Delivery Methods (such as microinjection, electroporation, and hydrodynamic techniques), Viral Vector Methods (using adeno-associated virus, lentivirus, and adenovirus), and Non-Viral Methods (including lipid nanoparticles, cell-penetrating peptides, and gold nanoparticles). Of these, Physical Delivery Methods are the most commonly used. CRISPR-Cas9 offers several advantages over other gene-editing approaches, including the ability to target multiple genes simultaneously, high accuracy, low cost, and straightforward design. In the future, CRISPR technology holds the potential to restore species, develop new and healthier foods, and possibly eradicate some of the world's most dangerous pests.

Keywords: CRISPR; genome editing; cas 9; delivery methods; nucleases; immune system.

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Influence of seed priming with calcium compounds on the growth and performance of Vigna radiata (L).R.Wilczeck in NaCl stress conditions

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Abiotic stress factors, salinity, drought, flooding, and high temperatures cause major crop losses worldwide. Mung bean (Vigna radiata (L.) R. Wilczek), a major legume grown in India is an essential source of proteins, micronutrients, and vitamins. Seed germination in all plants including legumes is highly sensitive to NaCl stress conditions (soil salinity). NaCl stress significantly decreases seed water uptake and amylase activity during germination, inhibiting seed development. Na+ ion toxicity affects the plants' physiology and also, affects its growth and development. NaCl toxicity also impairs the homeostasis of both K+ and Ca2+. Priming of seeds, a controlled hydration technique allows pre-germinative metabolic activity to continue, thereby improving the final germination percentage. In this study, the efficacy of priming seeds with Ca2+ compounds in regulating the germination of seeds (Vigna radiata (L.) R. Wilczek) in NaCl stress was examined. It was shown that priming with calcium compounds, CaCl2, Ca(NO3)2, CaSO4, resulted in enhanced germination and seedling growth in comparison to hydropriming. Further, CaCl2 priming also showed significant differences in seed water uptake, confirming altered physiological status. CaCl2 priming reduced ion leakage, thus ensuring minimal damage to the cell membrane in NaCl stress conditions. The osmoprotectants, proline, and total soluble sugars were enhanced compared to the unprimed seeds. The Ca2+ and K+ content was shown to be improved, along with a reduction of Na+ ions. In summary, calcium-based seed priming ameliorates the adverse effects of salinity stress by enhancing water uptake, altering the Na+ content, and imparting tolerance to NaCl stress.
Key words: NaCl, CaCl2 priming, starch mobilization, Na+/K+

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Monitoring and Detecting anomalies In Cardiovascular readings with special reference to electrocardiogram data

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This project focuses on developing a robust method for detecting anomalies in time-series heart rate data, laying the groundwork for a software solution aimed at real-time health monitoring. Using synthetic data that simulates typical heart rate patterns, the project employs threshold-based detection to identify abnormal heart rates—specifically those exceeding 120 bpm or dropping below 35 bpm. To improve detection accuracy, the data is normalized, and a rolling mean is applied to smooth fluctuations and highlight significant deviations. The results are visualized to demonstrate the system's capability to detect anomalies effectively. This project is a key step towards building software that can be integrated into health monitoring systems, providing early warnings for potential health issues.

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The effect of music on attention and working memory among young adults.

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Background- Attention and working memory are the basic parameters of success in students' lives. There is a decline in today's youth's attentional and working memory abilities due to overindulgence in short media and social media content. This study aims to study the effect of different genres of music on the attention span and working memory of emerging adults.
Methodology- 75 University students will be selected through a stratified sampling method. The students will be equally divided into three music groups. Indian music, Western music, and Control groups. Over 6 days the music groups will listen to assigned music for 30 min on the university campus. The control will not engage in any listening activity. Pre- and post-intervention assessments using the Stroop test will be measured to assess attention and working memory.
Results and Analysis- Analysis of the data will be conducted using SPSS software. Descriptive statistics will be utilized to describe the study participants. Anova will be utilized to assess the changes within and between two groups.
Expected Conclusion- Findings may have implications for using music as a tool to enhance attention abilities in educational and therapeutic settings.
Keywords: attention, music cognition, Indian Classical music, Western Rock music.

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Advancing Sustainable Agriculture: A Comprehensive Review of Practices, Technologies, and Policy Interventions for Food Security and Nutrition

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Sustainable agriculture is essential for ensuring long-term food security and nutrition while preserving environmental resources. This review provides the insights on the critical integration of agroecological practices, soil health management, innovative technologies, and policy interventions in advancing sustainable agriculture. Agroecological practices, grounded in the principles of ecological balance and biodiversity, encompass methods such as organic farming, agroforestry, and integrated pest management. These practices promote resilience and reduce reliance on external inputs. Soil health management is another fundamental of sustainable agriculture, emphasizing practices like cover cropping, crop rotation, and organic amendments to enhance soil fertility, improve crop productivity, and increase nutrient content. Emerging technologies, including precision farming, hydroponics, and vertical farming, offer innovative solutions for sustainable food production, optimizing resource use and minimizing environmental impacts. Policy interventions play an important role in supporting sustainable agricultural practices by providing frameworks and incentives that encourage adoption and scaling. Effective policies can drive positive outcomes in food security, nutrition, and environmental sustainability. The review further highlights the interconnections and synergies between these elements, demonstrating how their integration can lead to more strong and resilient agricultural systems.

Key words: Sustainable agriculture, Agroecological practices, Soil health management, Innovative technologies, Policy interventions

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Alpha-Induced Changes in GaN HEMT C-V Characteristics

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Studying the impact of alpha particles on GaN HEMTs is essential for understanding how radiation affects capacitance-voltage (C-V) characteristics. Radiation-induced defects can change the C-V profile, affecting crucial parameters like 2DEG density and threshold voltage. This paper investigates the impact of alpha radiation on Gallium Nitride (GaN) High Electron Mobility Transistors (HEMTs), with a focus on changes in capacitance-voltage (C-V) characteristics. The GS0650302L GaN-HEMT device has been exposed to a 45 MeV alpha beam at 40 nA using the VECC K-130 Cyclotron, receiving a dose of 179 Gy to simulate space radiation conditions. Following irradiation, the device has been cooled to stabilize isotopes, and gamma counting was performed to assess transmutation effects. The research analyzes key parameters such as the two-dimensional electron gas (2DEG), polarization effects, on-state resistance, and threshold voltage. Results indicate that alpha radiation exposure degrades 2DEG density, leading to reduced overall capacitance and a positive shift in threshold voltage. These changes are attributed to radiation-induced traps depleting carriers from the 2DEG. The study also report changes in polarization effects and an increase in on-state resistance, likely due to decreased 2DEG density and heightened scattering from radiation-induced defects.

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Production of biofuel from Dictyosphaerium ehrenbergianum, Chlorella sorokiniana and Mougeotia gracillima

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The isolated microalgae were harvested. The biomass yield was calculated, dried and the dry weight was determined. The dried microalgal cells were subjected to total lipid estimation using gravimetry. A total of 10 different fatty acids were identified from the FAME products of lipids of Dictyosphaerium ehrenbergianum using GC-MS analysis of trans esterified microalgal lipids, among which oleic acid, palmitic acid, linoleic acid, palmitoleic acid and dodecyl acrylate were recorded as major fatty acids, whereas fatty acids of Phenol, 2,4-bis(1,1-dimethylethyl), Methyl stearate, 3,7,11,15-Tetramethyl-2-hexadecen-1-ol showed least lipid percentage abundance. Chlorella sorokiniana showed linolenic acid, palmitic acid, 2-propenoic acid methyl palmitoleate, hexadecadienoic acid and propionic acid as major fatty acids. Whereas fatty acids of Heptane 3,3,5-trimethyl, Decane, 3-ethyl-3-methyl, Phenol, 2,4-bis(1,1-dimethylethyl) showed least lipid percentage abundance. Mougeotia gracillima showed Hexadecanoic acid methyl ester, and 9,12-Octadecadienoic acid methyl ester were recorded as major fatty acids, whereas fatty acids of 3,3-dimethyl hexane, 3,8-dimethyl-Undecane and 2,4-bis(1,1-dimethylethyl)- Phenol showed least lipid percentage abundance. Biofuel property was also analyzed and compared with different standards. This study was attempted to contribute towards renewable energy and sustainability.

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Food Technology: Evolution, Core Areas, and Global Impact on Nutrition and Sustainability

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Food technology has a fundamental role in shaping the modern food industry, significantly influencing food quality, safety, and nutrition. This review provides a comprehensive exploration of food technology, tracing its historical evolution from early preservation methods to contemporary innovations. The core areas of food technology processing, preservation, packaging, and fortification are critically examined, highlighting their impact on nutritional value and food sustainability. The review explores into innovative technologies, such as biotechnology, that are transforming food production and addressing global challenges, including food security, sustainability, and public health. Ethical and regulatory considerations surrounding food technology are also discussed, emphasizing the need for responsible practices and robust frameworks to ensure consumer safety and environmental protection.
Key words: Food technology, Food processing, Nutritional enhancement, Sustainability, Food safety

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Cyclophosphamide-induced oxidative stress in Platelets: Effect of N-acetylcysteine in vitro

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Background: Therapeutic drugs are capable of causing oxidative stress (OS) during their course of action while undergoing metabolism. Platelets are present in whole blood microenvironment and are susceptible to the presence of free radicals. Cyclophosphamide is a chemotherapeutic drug capable of generating high reactive oxygen species and thereby, induces OS in platelets. It is also implicated in thrombocytopenia. Antioxidants can mitigate the OS and attenuate the damage caused by these radicals. N-acetylcysteine (NAC), a thiol compound is a potent scavenger of reactive oxygen and nitrogen species (ROS and RNS). This study investigates the influence of NAC on platelets during cyclophosphamide-induced OS.
Methods: Platelets isolated from the whole blood of male *Wistar* rats were categorized into four groups (n=5): Controls, Drug (cyclophosphamide-treated), NAC (NAC-treated), and Drug+NAC (NAC preincubated and cyclophosphamide treated). Antioxidant defenses, oxidative stress, and platelet functions were analyzed.
Results: Superoxide dismutase, catalase, glutathione, and protein sulfhydryls increased and ROS decreased in Drug+NAC compared to Drug. ATP secretion and aggregation increased in Drug+NAC compared to Drug.
Conclusion: N-acetylcysteine was capable of augmenting the endogenous antioxidant defenses in platelets and also, scavenged the ROS efficiently. It protects the protein thiols from oxidative damage. It improved platelet responsiveness to collagen by ameliorating ATP secretion and aggregation of platelets. Therefore, NAC has proved to be beneficial to platelets during cyclophosphamide-induced OS. This study lays the foundations for the potential application of NAC in animal models of OS.

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Effects of Caffeic acid on platelets during storage

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Background: Banked platelets are used for transfusion purposes during medical emergencies due to unavailability of donors. Platelet shelf-life is limited to 3-5 days in plasma at 22-24℃ as they develop lesions. Oxidative stress (OS) causes storage lesion that affect platelet function and physiology. Platelet additive solutions (PAS) mitigate storage lesions by lowering the plasma concentration. SSP+ is a PAS prevalently used in India. Antioxidant additives in PASs can attenuate OS. Caffeic acid (CA) is an antioxidant that scavenges reactive oxygen species (ROS), inhibits lipid peroxidation and upregulates antioxidant defenses. This study explores the effect of CA on platelets during storage.
Methods: Platelets isolated from the blood of male *Wistar* rats (n=5) were grouped into i) controls and ii) Experimental (with CA), stored at 22℃ for 11 days. The markers of platelet functions, oxidative stress and antioxidant defenses were analysed on days 1, 4, 7 and 11.
Results: CA enhanced superoxide dismutase and catalase; decreased superoxide radicals and TBARS compared to controls. Platelet function was preserved as aggregation without collagen declined due to lower P-selectin levels.
Conclusion: CA could mitigate oxidative stress and maintain the efficacy of stored platelets beyond day-7. Hence, Caffeic acid could serve as an effective additive in PAS thereby, improving platelet banking practices.

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Production and application of lipase from Aspergillus tamarii JU-CLF03

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Lipases are the class of enzymes which catalyse the hydrolysis of long-chain triglycerides. The present study focuses on identification of a potent lipolytic fungus, production of lipase through optimization of nutritional and cultural conditions under submerged fermentation and application of lipase. Molecular characterization of the fungal isolate JUCLF03 by Internal Transcribed Spacer (ITS) rRNA sequencing revealed its identity as *Aspergillus tamarii* with 99.83% homology (GenBank accession PP565338). Maximum lipase production was noted in mineral salts medium supplemented with sesame oil (1%, v/v). Lipase assay was performed titrimetrically using olive oil and phenolphthalein as the indicator. A combination of ammonium chloride (2%, w/v) and yeast extract (1%, w/v) facilitated maximum lipase production (3800 U/ml) at initial pH 6 of the production medium. There was an increase in the enzyme production in the presence of surfactant cetyltrimethylammonium bromide (0.5%, w/v). Maximum lipase activity was recorded after 6 days of incubation at 25±2℃ on a rotary shaker at 120 rpm. Oil destaining activity of the lipase on the fabric pieces was determined using both cold and hot water in the presence and absence of commercial detergent. Treatment involving hot water (50℃) and lipase demonstrated maximum lipolytic activity after 30 min of fabric treatment. Further studies need to be conducted to characterize the fungal lipase for its industrial application.

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Abiotic Stress Mitigation Strategies for Enhancing Crop Resilience in a Changing Climate

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Abiotic stress poses a significant threat to agricultural productivity, particularly as climate change intensifies environmental challenges such as drought, salinity, and extreme temperatures. This abstract examines recent advancements in mitigating abiotic stress in crop plants, through the application of plant growth-promoting rhizobacteria (PGPR) and plant growth-promoting fungi (PGPF), which have emerged as promising biological solutions, focusing on innovative strategies that enhance resilience and ensure food security. They inhabit the soil and thrive in the rhizosphere, where they enhance plant growth and productivity through various direct and indirect mechanisms such as the production of phytohormones, siderophores, and solubilization of minerals. It allows better water and nutrient uptake, promoting root development, and inducing systemic resistance to environmental stresses. These microbes can modulate plant physiological processes, such as antioxidant enzyme activity which mitigates oxidative stress caused by reactive oxygen species (ROS) during abiotic stress. This enhancement helps protect plant cells from damage and maintains metabolic functions. osmotic adjustment, by promoting the synthesis of compatible solutes like proline and soluble sugars. These compounds help maintain cell turgor and stabilize proteins and membranes, enabling plants to withstand water deficits (drought), salinity, and extreme temperatures. Recent studies highlight the role of specific PGPR strains in enhancing drought tolerance by improving soil moisture retention and promoting root biomass expansion, while PGPF has been shown to enhance nutrient bioavailability, particularly in saline soils. PGPR synthesizes various phytohormones, such

as auxins, cytokinins, and gibberellins, which promote cell division and elongation, thereby enhancing plant growth and resilience. These hormones also help regulate plant responses to stress by modulating stomatal closure and improving water use efficiency. The application of PGPR represents a sustainable and eco-friendly approach to enhancing crop resilience against abiotic stresses.
Keywords: Climate Change, Abiotic Stress, Crop Resilience, PGPR, PGPF, ROS, phytohormones.

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Development Of Nano Adsorbents From Agricultural Wastes And Their Application In Mitigation Of Organic, Inorganic Pollutants From Industrial Effluents

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The need for a sustainable and eco-friendly solution in order to address water as well as environmental pollution has led to a surge in research focusing on the development of efficient adsorbents derived from agricultural wastes. Owing to recent problems regarding water sanitation and waste management, this project was initiated in the hopes of battling such issues through sustainable and economic ways. This project consists of a review of the development and application of nano adsorbents synthesized from agricultural wastes: Rice bran waste for the mitigation of both organic and inorganic pollutants from industrial effluents. The utilization of these agricultural wastes as precursors for nano adsorbents offers a promising avenue for waste valorization and environmental remediation. Various synthesis methods, including physical, chemical, and biological approaches, have been employed to convert these abundant agricultural residues into nanostructured adsorbents with enhanced surface properties and adsorption capacities. The application of these nano adsorbents in the removal of organic pollutants such as dyes, phenols, pesticides, and pharmaceuticals, as well as inorganic pollutants including heavy metals, metalloids, and metal ions, from industrial effluents has been extensively investigated. The high surface area, porous structure, and functional groups present on the nano adsorbents facilitate efficient adsorption of pollutants through mechanisms such as ion exchange, surface complexation, and electrostatic interactions. Furthermore, the influence of various factors such as pH, temperature, conductivity initial pollutant concentration, contact time, and adsorbent dosage on the adsorption performance of nano adsorbents has been systematically evaluated. Optimization of these parameters is crucial for enhancing the efficiency and practical applicability of nano adsorbents in industrial wastewater treatment processes.

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Impact Of Meditation On Mental Health During Sleep

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Meditation brings a lot of differences to the human brain; it is usually practiced to improve focus and consciousness in oneself. This study focuses on the impact of Meditation during sleep. Observations were made based on the correlation between brain activity with age and their experience in meditation. This Study used an existing research lab (NIMHANS) dataset to observe the difference in the brain activity of meditators and controls during their sleep. Full-night sleep EEG data from 60 subjects were used in this study. The study found that meditators show EEG signatures of enhanced state of wakefulness or restful alertness in their sleep compared to non-meditators. The data was analyzed using MATLAB, and different phase-based EEG connectivity measures (dwpli and plv-fast)

were computed for different sleep stages. The raw connectivity values and their density/strength values were computed for different frequency bands and sleep stages. These were examined for correlations using the Spearman rank correlation test. We found significant positive correlations between EEG connectivity values and years of meditation proficiency in multiple frequency bands (especially theta and alpha bands) in occipital regions. This means that more proficient in meditators show higher functional brain connectivity in posterior regions during the N3 sleep Stage, suggesting a more wakeful alertness alongside enhanced deep sleep and reduced arousal.
Keywords: EEG, N3 Stage, Occipital Region, Vipassana Meditation.

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Optimizing Performance in GaN HEMTs Through Doping, Layer Thickness, and Polarization

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GaN High Electron Mobility Transistors (HEMTs) are essential for high-power and high-frequency applications due to their superior performance characteristics. Understanding the effects of doping concentration, buffer layer thickness, and polarization is crucial for optimizing these devices. This study explores the impact of doping concentration, buffer layer thickness, and polarization effects on the performance of GaN High Electron Mobility Transistors (HEMTs) with p-gate structures using TCAD software Silvaco. It has been found that variations in doping concentration in the AlGaN buffer layer significantly influence the 2DEG density and device characteristics, with moderate doping levels (1E17 cm-3) providing optimal performance. The thickness of the AlGaN layer affects piezoelectric polarization and 2DEG confinement, enhancing device performance up to a point before introducing potential issues. Spontaneous and piezoelectric polarization effects improve input characteristics as their values increase, though the combined effect must be carefully managed. Temperature variations impact device performance by altering polarization fields and 2DEG density, with higher temperatures leading to increased gate leakage and reduced transconductance. Optimizing these parameters is crucial for achieving balanced device performance.

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Digital Health and AI in Personalized Oncology: The Pivotal Role of Genetic Counselors

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The integration of digital health and artificial intelligence (AI) in oncology is revolutionizing personalized healthcare and offers unprecedented opportunities for direct and personalized care. Genetic variation is important for understanding cancer type, progression and response to treatment. This abstract explores the transformative potential of AI and digital health in oncology, highlighting the

important role of genetic counselors in this changing environment. AI-based tools and digital health platforms allow us to analyze large genetic data sets to easily identify clinical variants with unprecedented speed and accuracy. Machine learning algorithms can predict patient-specific treatment response, identify new treatment targets, and improve early detection by integrating multi-omics data. These advances herald a new era of precision oncology, where treatment plans are tailored to the molecular profile of each patient's tumor.
Genetic counselors are uniquely positioned to bridge the gap between advanced genomic technologies and patient care. They play an important role in interpreting complex genetic information, turning it into actionable knowledge and guiding patients through their personal treatment journeys. Genetic counselors can use artificial intelligence and digital health tools to provide more accurate risk assessments, support decision-making, and improve the patient experience.

Digital health platforms also offer new ways to improve patient engagement and adherence to treatment plans. Mobile health apps, telehealth, and digital clinical interventions can provide real-time support, monitor treatment progress, and facilitate communication between patients and healthcare providers. These technologies not only improve the delivery of care, but also enable patients to take an active role in managing their own health.
In conclusion, the integration of digital health and AI in oncology represents a paradigm shift towards more efficient and effective cancer treatment. Genetic counselors are the main drivers of this change, ensuring that the benefits of these technological advances are fully realized in clinical practice. By embracing digital health and AI, genetic counselors can improve patient outcomes and contribute to the future of precision oncology.

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Microbial Strategies for Plastic Degradation

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Plastic pollution represents a critical environmental challenge, driving the need for innovative and sustainable solutions. This review provides a comprehensive examination of the current literature on microorganisms capable of degrading plastic materials, including bacteria, fungi, and enzymes. These microorganisms utilize a variety of strategies, such as enzymatic hydrolysis and depolymerization, to break down polymers found in plastics.
Significant discoveries have identified key plastic-degrading microorganisms, including Ideonella sakaiensis, Rhodococcus species, and Pestalotiopsis microspora, as well as enzymes like PET hydrolases and cutinases. These agents have demonstrated the ability to depolymerize a range of plastics, such as PET, PBT, PA, and PU. Advances in enzyme engineering and structural biology have further improved the efficiency and specificity of these enzymes, paving the way for their application in bioremediation, waste management, and the development of biodegradable plastics.
Despite these promising developments, several challenges remain for the large-scale implementation of microbial plastic degradation. A deeper understanding of environmental factors, plastic composition, and microbial interactions is essential to optimize these processes. This review emphasizes the need for continued research to overcome these barriers and enhance the potential of microbial technologies in combating plastic pollution. The insights gained from this review offer valuable guidance for future studies aimed at achieving a sustainable and effective approach to plastic waste management.
Keywords: PET, bioremediation, biodegradation, hydrolase

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Sustainable Bioplastic Production from Microalgae, "Pond Scum to Bioplastic"

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The environmental impact of conventional plastics has led to the search for sustainable alternatives, with bioplastics emerging as a promising solution. This study focuses on the cultivation of microalgae and the subsequent conversion of the harvested biomass into biodegradable plastics. Microalgae are an ideal feedstock due to their rapid growth, high biomass productivity and minimal land requirements. This study explores the potential of microalgae as a renewable source for bioplastic production. Through cultivation and processing, microalgal biomass was converted into biopolymers for bioplastic synthesis. This research highlights the potential of using microalgae as a renewable and eco-friendly source for bioplastic production, contributing to a reduction in plastic pollution and supporting environmental sustainability. The process of producing bioplastics from microalgae begins with selecting a suitable microalgal strain and cultivating it under optimized conditions to maximize biomass yield. The harvested biomass is then dried and processed to extract biopolymers, such as polysaccharides and proteins. These biopolymers are used to synthesize bioplastic through polymerization and moulding techniques. The resulting bioplastic is tested for mechanical properties like tensile strength and flexibility, and its biodegradability is assessed under composting conditions. This approach highlights the potential of microalgae as a renewable and eco-friendly source for sustainable bioplastic production.

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Screening of Pancreatic lipase inhibitors from endophytic fungi

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Lipase inhibitors are compounds that locally block pancreatic and gastric lipases in the stomach and small intestine, preventing the hydrolysis of triglycerides (TGs) from food into absorbable monoglycerides and free fatty acids. Pancreatic lipase (PL) is considered as one of the safest target for diet induced anti induced, anti-obesity drug development. Search for pancreatic lipase (PL) inhibitors is essential for obesity and associated chronic disease therapy. PL inhibitors significantly reduce enzyme activity and prevent the absorption and hydrolysis of triglycerides into free fatty acids. This review outlines a comprehensive approach to discover and characterize pancreatic lipase inhibitors derived from endophytic fungi, aiming to develop novel therapeutic agents for obesity and metabolic disorders. The methodology includes the isolation of fungal strains, screening for lipase inhibitory activity through agar plate and spectrophotometric assays, and extraction of active compounds via fermentation. Further analysis involves in vitro enzyme assays, characterization using mass spectrometry and NMR, molecular identification through DNA sequencing.

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Evaluation of Antiherbivoral, and Antibiofilm Activities in Trichomes of Coleus amboinicus and Solanum lycopersicum.

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This study undertakes evaluation of the antiherbivoral, and Antibiofilm activities exhibited by trichomes in Coleus amboinicus and Solanum lycopersicum .This employs a combination of in vitro and in vivo assays to investigate the chemical composition of trichome secretions from Coleus amboinicus (Indian borage) and Solanum lycopersicum (tomato). The research focuses on evaluating the effectiveness of these secretions in inhibiting deterring herbivores, and preventing biofilm formation. The aqueous extract and methanolic extract was used for preliminary analysis of metabolites .HPLC of the samples analysed a number of secondary metabolites such as terpenoids, phenolics, alkaloids, cyanogenic glycosides and gossypol Antiherbivoral effects are assessed using herbivorous insects like Drosophila melanogaster in controlled environments. Additionally, the antibiofilm properties are examined against common bacterial strains like Bacillus species and Staphylococcus species known for biofilm formation. The result demonstrated positive Antiherbivoral and Antibiofilm activity.

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Evaluation of bacterial isolates with bioremediation potential for plant growth promotion traits in millets.

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Plant Growth-Promoting Rhizobacteria (PGPR) are useful in suppressing plant diseases and promoting growth and development. The aim of the present study is to evaluate potent textile dye degrading isolates for PGPR traits. The main aim of this research is to attempt enhancing the yield of millets by using the growth promotion property of the isolates. A total of four isolates with good dye degradation ability were evaluated for PGPR traits and were characterised using biochemical tests and molecular techniques. The isolates were tested for traits such as Indole production, Phosphate solubilization, Zinc solubilization, HCN production, Ammonia production and Siderophore production and the isolates represented as S1, G1, MB and DR answered positive for most of the PGPR properties. Antifungal activity was also checked and S1, G1 and MB possessed good antagonistic property against Aspergillus sp. and MB exhibited a maximum percentage inhibition of 74.75%. In vitro seed germination assay was performed for the millets Jowar, Bajra and Ragi and maximum root and shoot length was recorded with MB treatment. Preliminary Pot culture assay was performed. Isolate MB showed maximum seed germination in comparison to the other two isolates (G1 & DR)

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Effect of fermenting on Proso Millet flour: A comparative kinetics study of Proso Millet and the effects on glycemic potential

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Millet species have gained significant importance in traditional Asian medicine and food for their ability to prevent and treat hyperglycemia and diabetes alongside being a good source for nutrition. Therefore, in this study, some aspects of the beneficial health effects of *Pancium Miliaceum* (Proso Millet) were evaluated. This focuses on the basic properties of the enzyme, being present in the millet. Assessing its optimum temperature, PH, total activity. Alongside this a kinetic study being performed to determine the function of the given enzyme and how it would behave in the human body, in relation to its effect on hyperglycemia and diabetes. These studies looked at a normal sample of the millet, as well as a fermented version of the millet, allowing for comparison between the two types.

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Utility Of Biogenic Silicon Nanoparticles In Crop Nutrition And Protection

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Nanotechnology is the latest emerging technology having enormous potential in almost all fields related to life sciences. To enhance plant growth and control fungal diseases, fertilizers, and fungicides are heavily used in the agricultural sector. The use of these chemicals affects soil and groundwater pollution and declining animal health. The application of nanomaterials in plants has potential in the advancement of nanotechnology. Since the last decade, nanomaterials have been used mostly in growth promotion and disease protection in agriculture.
Biogenically synthesized silicon nanoparticles have the unique features of smaller size, great surface area, high solubility, reactivity, good absorption capacity, and easy penetration that's why it is anticipated as the most important nanostructures in agricultural applications. Silicon nanoparticles (SiNPs) are applied in plants by foliar, soil, and seed priming methods.
SiNPs applied through foliar spraying reduce pest attacks and fungal incidences due to their accumulation in cell walls. Soil-applied SiNPs act as fertilizer source cum delivery molecule which helps in elevating photosynthetic activities and flowering in treated wheat and onion crops. Seed priming with SiNPs improves seed viability and germination characteristics of onion crops. SiNPs have the potential to regulate abiotic stress conditions like drought, and salinity. In post-harvest management practices, SiNPs enhance the storage and preservation of agricultural commodities for a longer duration.

Keywords: Silicon nanoparticles, Agriculture, Fungicides, Germination, Onion

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Health Care Chatbot

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The 24/7 Medical Chatbot is an AI-powered application designed to enhance access to healthcare by providing personalized medical advice and prompt responses to user queries. The system aims to

bridge the communication gap between users and healthcare providers, particularly for those hesitant to seek medical attention for minor issues that could escalate into serious conditions. Utilizing Natural Language Processing (NLP) and Machine Learning (ML) algorithms, the chatbot engages in conversational interactions, understands symptoms and health concerns, predicts potential diseases, and recommends appropriate next steps, including doctor suggestions and home remedies. The project addresses several gaps identified in existing healthcare solutions, such as the lack of instant responses, insufficient coverage of diverse health issues, and the absence of personalized treatment suggestions. The system architecture integrates a user-friendly interface with backend ML models to provide accurate and timely health advice. This innovative approach not only encourages proactive health management and early disease detection but also aims to improve healthcare accessibility, especially in remote areas. The 24/7 Medical Chatbot makes sure that everyone, anywhere someone may be worldwide, has an opportunity to lead and enjoy a healthy life by promoting a culture of empowerment and health consciousness.
Keywords: Symptoms, disease, Hospital, medical chatbot, NLP and query.

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Comprehensive Analysis of Antimicrobial Resistance in Indian Urban Sewage

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Antimicrobial resistance (AMR) poses a significant public health threat in India, particularly in urban areas. This study investigated the prevalence of resistant pathogens and antibiotic resistance genes (ARGs) in sewage samples collected from major Indian cities, including Bengaluru, Hyderabad, and Gujarat. A diverse range of multidrug-resistant (MDR) pathogens, including *Escherichia coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*, were identified in the sewage. These opportunistic pathogens are known for their ability to cause severe infections and are resistant to multiple antibiotic classes.

Furthermore, the analysis revealed a high diversity of ARGs in the sewage samples, with over 150 distinct ARGs detected in Bengaluru alone. These genes confer resistance to critically important antibiotics such as carbapenems, fluoroquinolones, and beta-lactams. Approximately 60% of the identified ARG subtypes were consistently detected, highlighting the persistent nature of the AMR problem in Indian cities.

The findings of this study underscore the urgent need for improved surveillance,
enhanced sanitation infrastructure, and effective antibiotic stewardship measures to mitigate the spread of AMR and ensure the continued effectiveness of antibiotics for future generations.

Key words: Anti-microbial resistance (AMR), multi-drug resistance, AMR surveillance,
antimicrobial resistance genes (ARGs), Public Health Threat

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A Water Purification System for Rural Household using Hybrid Renewable Electrical Power

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This work discusses the design and development of a solar photovoltaic and wind power based portable water purifier unit that uses an auxiliary resonant converter to harvest solar energy at maximum possible efficiency using soft switching technique. This power supply powers a water purification system that can be used in rural households. The invention is a innovative energy generation scheme through solar and wind energy combined as an hybrid system. The innovation in this work is the use of ring turbine to generate the power from the wind and thin film solar panels stuck all over the surface of the ring turbine to generate power from the solar radiation thus forming a hybrid generation system. The energy harvested in this way is fed to a new topology of converter known as auxiliary resonant converter which works with soft switching technology to reduce the converter losses. This converter is connected to a water purification system to purify the locally available water at rural areas. A simulation model using MATLAB is developed and the output voltage and current waveforms were obtained. A working model was also developed and the prototype model is applied for patent with IPR.

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Image Captioning Using Deep Learning

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In the recent years, Image captioning has gained significant attention due to its potential applications in various fields, including aiding the visually impaired and enhancing content accessibility. This project aims to develop an efficient and accurate image captioning system using a novel combination of deep learning frameworks. The proposed model utilizes EfficientNetV2 as the encoder to extract high- quality features from the input images, leveraging its superior performance in image classification tasks. These features are then passed to GRU at the decoder end, which generates descriptive and contextually relevant captions. By integrating EfficientNet and GRU, the model aims to achieve high accuracy and robust performance in caption generation.
The mscoco dataset is used for training and testing the model, and extensive data augmentation techniques are applied to improve the model39;s generalization capabilities. This approach is expected to overcome computational and latency challenges, providing a scalable solution for real-time image captioning.

Keywords: Image Captioning, Deep Learning, EfficientNetV2, GRU, mscoco, Caption generation.

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The art of audio: generating text and images

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In this paper, we explore a novel multi modal approach that bridges the gap between audio, text and visual representation by utilizing the Clotho dataset, a comprehensive collection of audio recordings with detailed textual annotation. Our methodology involves two primary stages: first we employ state-of-the-art audio processing and natural language processing techniques to transcribe audio data into accurate textual representations. In the second stage, we transform these transcriptions into visual forms, creating an innovative way to visualize the content and structure of audio information.
Through this study, we aim to advance the field of multi modal data analysis by demonstrating how audio, text, and visual elements can be seamlessly integrated to offer enriched user experiences and

deeper analytical capabilities. The proposed framework contributes to ongoing research in this field and opens up new possibilities for future exploration and applications.

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Sustainable Impact Of Hydrogels In Resolving Global Water Scarcity And As A Food Preservative Agent

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Water scarcity is a significant global problem, affecting more than 700 million people worldwide who do not have access to clean drinking water, which can lead to the prevalence of water borne diseases like cholera and typhoid. India is placed 13th among the world's water-deficient countries due to its large population and the existing effects of climate change. Access to clean water is an absolute necessity for agricultural purposes, society's health and well-being, etc. Hydrogels, due to their ability to absorb and retain water, provide a possible solution to this. Thanks to their 3D conformation, biocompatible molecules can improve water filtration methods by eliminating contaminants like heavy metals (arsenic, lead) and harmful bacteria. By combining hydrogels into existing water filtration systems, we can work on improving water quality and reduce the frequency of replacements, which could otherwise contribute to environmental degradation. In addition, hydrogels can serve as a form of food preservatives, possibly increasing natural shelf life and inhibiting microbial growth, which could otherwise lead to excessive food wastage. When paired with natural and synthetic antimicrobial agents like chitosan and triclosan, hydrogels can further enhance food safety. By creating a combined approach that utilizes hydrogels for both water filtration and food preservation, we can achieve more efficient resource utilization and improve our approach towards sustainability.

Keywords: Water Scarcity, Hydrogels, Water Filtration, Contaminants, Food Preservation, Sustainability

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Quantum Materials for Next-Generation Technologies: Challenges and Future Directions in Energy Devices and Quantum Computing

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Quantum materials, characterized by the emergence of quantum mechanical effects at macroscopic scales, have garnered significant interest due to their potential to revolutionize various technological domains. This class of materials, including graphene, topological insulators like Bismuth Selenide (Bi_2Se_3), and high-temperature superconductors such as Yttrium Barium Copper Oxide (YBCO), exhibits unique properties like zero electrical resistance and topologically protected states. Studying

quantum materials is imperative to advance our understanding of complex electron, spin, and lattice interactions. Given the limitations of current technologies, there is an urgent need to explore these materials to develop next-generation quantum computing, energy storage solutions, and sensing devices. This paper addresses the critical need for continued research in quantum materials, bridging fundamental physics with transformative applications.

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LiDAR technology for Climatology and Environment Sustainability

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The two crucial factors that impact the society and environment are the climate change and sustainable development. The climate change has become a pressing concern currently at global, regional, and local scales as it is directly connected to the human-welfare. Investigation of the real-time climatology is the only solution to address the environment sustainability, which calls for innovative technologies to monitor the climate change periodically and precisely in both day and night times. Active remote sensing of the earth atmosphere can bridge and enhance the understanding of the surrounding environment. One such active remote sensing technology is the 'LiDAR'(Light Detection and Ranging) technology which has the ability to probe and profile the atmosphere at molecular levels. Ground-based and air-borne LiDARs have shown to provide valuable information, but their application is limited to local scales. Space-borne LiDAR is a viable technological domain to observe our planet from remote distance at global scale. Through this paper, we present details of our work related to baseline configuration and link-budget estimation for a zenith-looking dual-wavelength back-scattering LiDAR. This LiDAR employs Nd:YAG laser operating at 106 and 532 nm wavelength with pulse energies of 60 mJ and 40 mJ coupled with a 200 mm diameter telescope to collect returns from the terrestrial troposphere. This LiDAR is aimed to study the distribution and estimation of dust and aerosols accumulation in the atmosphere, which are among the prime agents for pollution triggering the climate change and affecting the human lives and environment sustainability.

Keywords: LiDAR, Nd:YAG Laser, estimation of dust, aerosols, sustainable development, climate change, Optics

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Development Of Low Cost Bioadsorbent From Jamaican Cherry (Muntingia Calabura) Plant Bark And Fruits In Mitigation Of Organic, Inroganic Compounds And Heavy Metals From Industrial Wastewater

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The study focuses on developing a low-cost bio-adsorbent from the bark and fruits of the Jamaican cherry (Muntingia calabura) to mitigate organic, inorganic compounds, and heavy metals in industrial wastewater. The fruit is not only known for its medicinal properties, such as anti-inflammatory and antioxidant effects, it is also abundantly found in Bangalore and its bark has potential for biosorption of heavy metals, notably chromium. The aim of this study is to develop biodegradable bio-adsorbents from the bark and evaluate their capacity to remove pollutants from wastewater. Experimental methodology includes collecting and drying the bark and fruit, subjecting them to various treatments, and analysing parameters like pH, temperature, and conductivity in treated and untreated effluents. Results indicated that the bio-adsorption was most effective at 30℃, with a notable decrease in pH and an increase in conductivity in treated samples, suggesting effective heavy metal disassociation. Further testing is being conducted using scanning electron microscopy (SEM) and FTIR analysis. This study highlights using Jamaican cherry as a sustainable and eco-friendly alternative to conventional wastewater treatment technologies which produce harmful byproducts through reduction and precipitation methods. The bio-adsorbent's low cost and high efficiency makes it a promising solution for industrial pollution management, with future research exploring regeneration techniques and advancements like magnetic bio-adsorbents. This study is innovative in exploring the biosorption capacity of the Jamaican cherry fruit, a previously unreported aspect, and emphasizes the sustainable use of local plant species to address environmental challenges.

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An Analysis of Fast Charging System for Electrical Vehicles

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Electrical vehicles are experiencing a rise in popularity over the past few years as the technology has matured and costs have declined, support for clean transportation has promoted awareness, reducing greenhouse gasses, increased charging opportunities and facilitated EV adoption. The electrical vehicle industries experience continuous advancements in charging technology to satisfy the rising need for fast and reliable charging. In this paper, the survey of scholarly literature and analysis of the fast charging infrastructure, different charging standards and control modes are discussed. It also explores the existing challenges and futures trends in electrical vehicle fast charging systems.

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Machine Learning Approaches for Landslide Susceptibility Mapping Using Multi-temporal Remote Sensing Data

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Landslides pose significant threats to human lives, infrastructure, and the environment worldwide. Accurate prediction and mapping of landslide susceptibility are crucial for effective disaster risk management and land-use planning. This study explores the application of advanced machine learning techniques in conjunction with multi-temporal remote sensing data for improved landslide susceptibility mapping. We compare the performance of several machine learning algorithms, including Random Forest, Support Vector Machines, and Deep Learning approaches, in predicting landslide

occurrence across diverse geographical regions. The integration of multi-temporal remote sensing data allows for the incorporation of dynamic environmental factors, enhancing the temporal accuracy of susceptibility models. Our results demonstrate the superior performance of ensemble-based methods in capturing complex terrain-landslide relationships. The proposed methodology achieves an overall accuracy of 85% in identifying high-risk landslide zones, outperforming traditional statistical approaches. This research contributes to the growing body of knowledge on data-driven landslide susceptibility assessment and provides valuable insights for the development of early warning systems and sustainable land management practices in landslide-prone areas.

Keywords: landslide susceptibility; machine learning; remote sensing; multi-temporal analysis; Random Forest; Support Vector Machines; Deep Learning

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Nature Connectedness and Climate Anxiety on Psychological Resilience among Young and Middle Adulthood

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Psychological resilience, or the ability to adapt in the face of adversity, is crucial for maintaining mental health, especially in the context of rising environmental stressors. This study investigates the impact of nature connectedness and climate anxiety on psychological resilience among young and middle-aged adults using a comparative correlational design. The research aims to determine whether resilience is higher in young adults, who are often driven by idealism and future concerns, or in middle-aged adults, who typically feel a stronger sense of responsibility for future generations. Additionally, the study examines gender differences in resilience within both age groups. Statistical analysis will explore how nature connectedness and climate anxiety interact to influence psychological resilience, with a focus on whether nature connectedness has a stronger positive effect on resilience in individuals with lower climate anxiety. The findings are expected to deepen our understanding of the interplay between environmental and psychological factors across life stages, contributing to the development of targeted strategies to manage climate anxiety and enhance resilience, ultimately improving mental health outcomes across age and gender groups.

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Drowsiness Detection Using Deep Learning

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The Driver Drowsiness Detection Project, the goal is to develop a system that can identify whether a driver is alert or drowsy. Detection of driver drowsiness helps prevent potential accidents, save lives, and reduce the economic impact of road incidents. This system assists drivers in recognising their fatigue state, allowing them to take necessary precautions before a dangerous situation arises. The project involves the creation of a diverse dataset encompassing alert and drowsy driving instances. The dataset undergoes preprocessing to standardize images, and examines facial features to detect drowsiness patterns, eye closure duration and yawning frequency. To analyze and classify driver states, the technique used here is Convolutional Neural Network (CNN). CNNs are powerful for image-related tasks, as they can automatically learn patterns and features from facial expressions and eye movements. The model incorporates two key metrics: the Eye Aspect Ratio (EAR) and Mouth Aspect Ratio (MAR), which quantifies eye closure and yawning, respectively. When signs

of drowsiness are detected, the system generates a voice alert to warn the driver. This real-time processing capability ensures timely interventions, crucial for preventing accidents.

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Integrating Multi-Omics Data for a Systems Biology Understanding

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The global response to the COVID-19 pandemic has catalysed unprecedented advances in technologies and techniques for elucidating human and pathogen biology, yielding vast amounts of multi-dimensional omics data. Genomics, transcriptomics, proteomics, epigenomics, and metabolomics, among other fields, provide unique insights into the intricacies of human cells, both normal and infected. However, the sheer scale and diversity of these data pose significant challenges for integration, necessitating innovative solutions to distil biologically meaningful context from source of information. The amalgamation of NGS data, variously termed integrated omics, multi-omics, poly-omics, trans-omics, pan-omics, or simply 'omics', is a complex task, hindered by differences in various steps in data handling throughout the process. The last area is to achieve a holistic systems biology understanding of biological processes, events, and diseases, but current methods are restricted by the "3 I's" - integration, interpretation, and insights. This review aims to provide a comprehensive overview of new methods, prevailing tools, and possible caveats in integrating omics datasets. With the decreasing costs and processing times for sample analyses and the increasing variety of datasets, including glycomics, lipidomics, microbiomics opens door to understand biological process at much finer details. The information obtained through this drive the discovery of biomarkers, diagnostics and novel targets for treatment.

Key Words: Omics technologies, Multi-dimensional omics data, Genomics Transcriptomics, Proteomics, Epigenomics, Metabolomics, Integrated omics

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Powder shampoo with antioxidant attributes

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According to the UN, over 30% of all forms of plastics produced are used as packaging material. Cosmetics and hygiene related products that are formulated in aqueous formats are all stored in plastic containers. It is desirable to minimize or eliminate the amount of plastic used as packaging material for Cosmetics and hygiene related products. In this regard, we have developed a shampoo formulation in powder format that can be stored and sold in environmentally friendly packaging material. The formulation contains a blend of surfactants and anticaking agents. Further, the formulation is functionalized by incorporation of antioxidant properties. In vitro studies performed by us reveal that the formulation exhibits good detergency action and antioxidant properties. Being of the powder format, the shampoo can also be manufactured with ease. Our formulation may assist in reducing the burden of plastic requirement by the shampoo industry and hence may contribute to SDG 12 and 14.

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To study the relationship between movie preferences with personality and lifestyle choices among emerging adults.

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Introduction: What we see and become seems to have a relation. There is a dilemma of whether our personality and lifestyle are based on what we watch in media or vice versa. The current study will measure the relationship between movie preferences with personality and lifestyle choices among emerging adults. There is limited research on understanding the relationship between movie preferences with personality and lifestyle choices.
Method: The Study will be quantitative with a sample of 120 adults sampled through convenience sampling from educational institutions and workplaces. The participants will be asked about their movie preferences through the Film Preference Questionnaire (Andrew Romans), secondly, the Manasa Prakrti Inventory (A. Arhanth Kumar, Shreevathsa Manjunath, and Arun Jainer) will be administered to assess personality traits and the Lifestyle questionnaire (Douglas Wilson & Ciliska) will be used to identify the lifestyle choices of 120 adult participants.
Analysis: Pearson's product moment Correlation will be used to understand whether a relationship exists between movie preference with personality and lifestyle choices among emerging adults.

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Antioxidant And Antibacterial Property Of Guar Gum Silver Nanoparticles

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Guar gum is a novel agrochemical processed from endosperm of cluster bean Cyamopsis tetragonoloba. Industrial applications of guar gum are possible because of its ability to form hydrogen bonding with water molecule. Thus, it is chiefly used as thickener and stabilizer. It is also beneficial in the control of many health problems like diabetes, bowel movements, heart disease and colon cancer. Chemically, guar gum is an exopolysaccharide composed of the sugars –galactose and mannose. The backbone is a linear chain of β-1,4-linked mannose residues to which galactose residues are 1,6-linked at every second mannose, forming short side-branches. Eco-friendly silver nanoparticles (AgNPs) were synthesized by using guar gum polysaccharide, since they have multi-functionalities owing to their ecological origin and biocompatible nature. The synthesized GG-AgNPs was primarily characterized by UV-VIS spectroscopy that showed the surface plasmon resonance (SPR) at 410-420 nm. In addition, the GG-AgNPs was evaluated for its antioxidant activity against DPPH free radicals. The antibacterial activity of guar gum will also be explored against entero-toxigenic bacterial strains.

Keywords: Guar gum, nanoparticles, antioxidant, antibacterial.

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Lead stress and its effects on growth, antioxidant activity, and L-DOPA Production in Mucuna pruriens (L.) DC

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The growing interest in herbal medicines has brought increased attention to medicinal plants, which are abundant in phytochemical compounds. However, concerns have arisen regarding the presence of heavy metals in some herbal formulations, likely due to the contamination of soil and water by industrial and agricultural activities in which these medicinal plants have grown. Lead, a toxic heavy metal, is known to induce the formation of reactive oxygen species, negatively impacting plant growth and overall productivity. This study explores the effects of lead on the growth and biochemical properties of Mucuna pruriens (L.) DC. To assess the impact, M. pruriens seeds were exposed to varying lead concentrations ranging from 200 to 2000 ppm over a 21-day period, for the determination of the LD50 value—the concentration at which 50% of the seeds successfully germinated. The LD50 for lead was identified as 1200 ppm, which then was used for the selection of lead concentrations for further polyhouse studies. Subsequently, the plants were cultivated in soil treated with lead concentrations ranging from 400 to 1600 ppm and were harvested after seed set formation, just before entering senescence, marking the completion of their life cycle. The findings revealed that lead exposure significantly affected both growth and various biochemical parameters, including levels of proteins, carbohydrates, chlorophyll, proline, total phenol and flavonoid content, malondialdehyde (MDA), L-DOPA, and antioxidant activity. Lead accumulation within the plants increased with higher concentrations, reaching a maximum of 947.47 mg kg−1 in plants treated with 1600 ppm of lead. Interestingly, L-DOPA content initially increased with increasing lead concentrations, peaking at 18.76 mg g−1 DW in the roots and 9.93 mg g−1 DW in the stems of plants treated with 1200 ppm, and 4.37 mg g−1 DW in the leaves at 400 ppm. The L-DOPA levels in the seeds of control plants and those treated with 800 ppm were similar, at 40.91 mg g−1 DW and 40.15 mg g−1 DW, respectively. Although lead accumulation followed a dose-dependent pattern, rendering the plants unsuitable for direct consumption, the increased L-DOPA content highlights the potential for its extraction and commercial application. The study also showed that lead-treated plants exhibited enhanced stress tolerance, evidenced by elevated proline levels, increased secondary metabolite production, and enhanced antioxidant activity.
Key words: Mucuna pruriens, L-DOPA, heavy metal stress, antioxidants, lead toxicity.

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Maternal Health Care Service Utilization among Tribal Women in Northeast India: Trends and Determinants

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Maternal deaths are results of preventable and treatable complications during pregnancy, childbirth, severe bleeding and infections after child birth, and unsafe abortions. To address inequalities and ensure access to respectful and high-quality of maternity care, ending preventable maternal deaths during pregnancy, the World Health Organization (WHO) recommends an access to maternal health care during pregnancy, childbirth and postnatal period. Against this backdrop, this research paper aimed to examine the trends and determinants of Full Ante Natal Care, Skilled Birth Attendance and Post Natal Care utilization among the tribal women in Northeastern states of India. The descriptive research design has been adopted for the study. The five rounds of NFHS data from 1992-92, 1998-99,

2005-06, 2015-16 and 2019-21 was used to portray the trend and determinants in utilization of maternal health care services among tribal women in Northeast India. Descriptive statistics analyzed the utilization trends of Full Ante Natal Care, Skilled Birth Attendance and Post Natal Care. Pooled multivariate logistics regression was conducted to identify the demographic and socio-economic determinates in utilization of maternal health care services. The utilization of maternal health care services among the tribal women in Northeastern states of India remains low and for which, increased efforts should be made to ensure effective implementation of ongoing programs.

Keywords: Tribal Women, Ante Natal Care, Skilled Birth Attendance, Post Natal Care

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Green Solutions for Restoring Soils Polluted by Heavy Metals

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Rhizobium bacteria induce plant growth and are known to be involved in the reduction of heavy metals toxicity. This work envisages the synergistic effects of rhizobial bacterial strains (JU 3) and Vigna unguiculata on the physiological changes caused due to heavy metal accumulation. Microgreens were divided into three groups: a) Control; b) Cadmium Control c) Cadbium + bacterium. The group that received the bacterium had a minimal impact on root and shoot length, germination index, and water content capacity of the plant. As well, there is a marked reduction in oxidative stress and elevation in antioxidant levels. Overall, this study suggests that inoculation of rhizobium promotes Cd stress tolerance by modulating, antioxidant machinery, by improving plant physiological parameters.

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Enhancing Phytoremediation of Heavy Metals and Saline Environments Using Green Silver Nanoparticles: Mechanisms and Efficacy

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Purpose
This study aims to envisages the synergistic effect of Vigna unguiculata legume, and green-silver

nanoparticle against salt and heavy metal stress
Materials and Methods
The seeds were sowed in a cocopeat and placed in a growth tray. The seeds were challenged with salt and heavy metal stress, and the experiment was carried out for 7 days. Alternatively, the seeds were examined for their physiological, and biochemical parameters.
Results and Discussion
• Physiological Parameters: Vigna unguiculata, and green-silver nanoparticles showed strong tolerance against salt and heavy metal stress. There was a minimal impact on root and shoot length, germination index, and water content capacity of the plant.
• Biochemical Responses: Antioxidant enzyme activity in the roots indicated effective stress mitigation. The plant exhibited significant biochemical responses to both stress, particularly in root tissues.
Conclusions
The findings suggest that Vigna unguiculata, and green-silver nanoparticles a viable candidate for phytoremediation and phytostabilization of salt and heavy metal-stressed soils, due to their physiological resilience and biochemical adaptability.

Cadmium (Cd) contamination in soil significantly threatens food safety and crop production, which tend to accumulate heavy metals. This study explores the synergistic effects of legumes to enhance growth and reduce Cd uptake in legumes grown in Cd-contaminated soil. Legumes were subjected to five treatments: untreated control, Salt (Nacl:10mM), Cadmium, nanoparticles+ salt, and nanoparticles+ Cadmium.
Results showed that the combined treatment significantly enhanced plant growth, as evidenced by increased biomass, antioxidants, and improved root development compared to the control, and increased survival status.Work together to mitigate Cd toxicity, either by immobilizing Cd in the soil or enhancing the plant's tolerance to Cd stress.

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Generation Ideal Quantum Entanglement State Requires Infinite Three Mode Squeezing

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The entanglement effects of light in the fundamental mode and harmonic mode in the third harmonic generation are investigated up to the Second -order Hamiltonian interaction. It is shown that as photon entanglement in the stokes mode are directly dependent upon the selective phase values of the field amplitude in both quadrature. It is also found that the degree of occurrence of entanglement directly depends upon the photon number of the Stokes field as well as on the harmonic field. It is shown that for particular phase values, the entanglement of light appear simultaneously. It is found that three -mode states exhibit entanglement properties under certain conditions of squeeze angle. It is also inferred that the generation ideal entanglement state requires infinite Three -mode squeezing. These results may pave the way for obtaining greater noise reduction in optical systems and can be useful in high-quality quantum telecommunication.

Keywords: Entanglement, Hamiltonian interaction, Harmonic mode

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Prototype Of Mycelium Based Material - A Prospective Packaging Material

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In the world that demands the use of ecological application for making more eco-friendly products in recent days is mycelium based composites. Different species of fungi display different characteristics with tremendous potential to invade, immobilize and binds the substrate and thereby increasing the strength of the materials formed. One of the newest and most promising is the fabrication of sustainable material with fungal mycelium immobilize or form a network or web like structure on agricultural wastes, generally called as mycelium brick.
Our research work aimed at investigating the possibility of using wood degrading and litter inhabiting basidiomycetous fungi. Primarily, three fungal strains were selected and tested for their faster growth and network formation on the substrate and combination of substrates. Two strains were identified based on their fast growth, rigidity and their growth pattern on the selected ligno-cellulosic substrates. Various physical and environmental parameters were tested on the growth of mycelium on the substrates. The resultant bio-composite materials were tried to create various size and shape moulds that are appropriate for producing packaging materials.
Assessment of biological and physiological properties of myco-material such as compressive strength, density, compostability, flame spread, water vapour permeation and moisture storage as per the ASTM (American Society for Testing and Materials) standard will also be assessed using standard methods which would throw more light on the suitability of these materials for packaging.

Keywords: fungi, mycelium, basidiomycetous, ligno-cellulosic, bio-composite, myco-materials.

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Harnessing Machine Learning and Artificial Intelligence for Omics Data Analysis

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Recent developments across various scientific fields have revolutionized biology through the advent of omics technologies. Multi-omics, an emerging field that integrates different omics data types, offers more comprehensive insights into biological processes than any single omics approach alone. Currently, many researchers routinely incorporate omics technologies such as proteomics and metabolomics into their studies to achieve a deeper understanding of complex biological systems. As technological advancements continue, the cost of omics research is expected to decline, making large datasets more accessible to the scientific community. The vast amount of data generated by omics technologies can be immense, necessitating advanced computational techniques for analysis. To address this challenge, scientists have developed artificial intelligence (AI) and machine learning (ML) tools capable of analysing these datasets, extracting significant biological information, and enhancing understanding of both normal and disease processes. AI and ML contribute to omics research by offering powerful capabilities in parameter selection, dimensionality reduction, complexity management, feature identification, pattern recognition, classification, and predictive modeling. By combining these cutting-edge approaches, researchers can create robust analytical frameworks that effectively manage the complexities of biological systems, thereby overcoming the limitations of conventional phenotyping techniques. This review aims to provide a comprehensive overview of the application of AI and ML tools in omics research, highlighting their potential to revolutionize understanding of biology.

Key Words: Machine learning (ML), Artificial intelligence (AI), Omics, Drug Discovery

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Review of Non-Isolated DC DC Converters for Fuel Cell Electric Vehicles

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Owing to the carbon emissions of IC engine vehicles and due to global warming more emphasis is on green energy. Electric Vehicles(EVs) is one of the prime solutions to drive this green energy trend. EVs stores the energy to drive the vehicle in the form of battery packs. One alternative for traditional battery pack is fuel cell. They use an electrochemical reaction to convert chemical energy to electrical energy. Fuel cell is a renewable energy source and is a clean solution. It offers several advantages such as high efficiency, low emissions, quiet operation. Fuel Cell Electric vehicles (FCEVs), as the name suggests, are a type of electric vehicle in which the electric motor that is used to propel the wheels are powered by Fuel Cells. However, fuel cells comes with issues such as non linear characteristics with respect to load which needs to be compensated for reliable operation. So fuel cell output is given to a DC-DC Converter to stabilize the voltage and provide the required power to the load. This paper discusses various topologies of contemporary DC-DC Converters. Thereby with the outline of the current DC-DC converters, further plan of action shall be laid out.

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Somatoscopic And Comparative Study On Cephalic And Facial Indices Among Twins From Kodinhi (Village Of Twins)

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Anthropometry is the investigation of the estimation of the human body regarding various elements of bone, muscle and fat tissue. Forensic anthropology is the application of the scientific study of the human Skelton within the context of medico and legal aspects. Somatometric measurements of cephalic, facial and nasal is useful in determining different races and ethnicity of a population. The cephalic index is an important parameter in determining the race of the individual whose identity is unknown. This study was taken to check if there is any similarities or differences in cephalic and facial index values between twin population of Kodinhi (the village of twins, India), Malappuram. The sample size was 200 pair of twins, out of which 100 pair was from male population and 100 from female population. The cephalic and facial index were measured and calculated and categorized using SPSS software. The present study showed there is significant difference in cephalic index between male and female population of twins. There was no significant difference in facial and nasal index between both the population. This data can be helpful in anthropology, clinical practice and identifying the racial origin.

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Drug Induced Alterations in Erythrocytes: An Overview

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Red blood cells (RBCs) make up over 99% of the cellular component of blood. Hemoglobin is made up of four polypeptide chains. Each chain binds to a heme group which is heterocyclic porphyrin ring that contains iron ion whose primary function is to transport oxygen. The RBC membrane is composed by 60% of phospholipids, essentially phosphatidylcholine (PC), phosphatidylethanolamine (PE), sphingomyelin (SM) and phosphatidylserine (PS). Anemia is a deficiency of hemoglobin in the blood, which can be caused due to low count of RBCs or lower hemoglobin. Anemia can be caused by various factors such as nutrient deficiency, infections, inflammations, other health conditions and certain drugs. Some of the therapeutic drugs like Cyclophosphamide, Alectinib, Lisinopril, Risperidone, Insulin, Naproxen, Levofloxacin, Dapsone hydroxylamine, Paclitaxel, Carboplatin, Sodium Valproate are used as first line of treatments. However, they have adverse effects on whole blood such as induced erythrocyte membrane alterations, changes in the reactive oxygen species and impact the erythrocyte sedimentation rate. In addition to this, they can also cause abnormal variations in morphology and leads to immunogenic reactions. Currently, antioxidants have gained focus as alternate and complementary therapies to manage these adverse effects.

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Flower Ash: A Sustainable Byproduct for Environmental and Industrial Applications

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Flower ash, a product of burnt floral waste, is very rich in minerals, especially, calcium, potassium, magnesium, and trace elements; therefore, it can be used in many different ways. Religious and cultural rituals always involve the use of flowers, they have become one of the major waste producers but are often overlooked. Transforming this waste into ash will make it one of the renewable resources in many other fields. In the field of agriculture, flower ash acts as a natural fertilizer, soil conditioner, and also helps in soil pH and improving plant growth. This is further used as an adsorbent in wastewater treatment for the elimination of heavy metals and other contaminants that are present in the water joining well with the surface of the ash due to its high surface area and active functional groups. Moreover, the alkalines are less that make the ash appropriate for inclusion in green cleaners as well as in making bioconstruction materials. Continuous research on the chemical composition and properties of flower ash can lead to more innovative uses in the industrial and environmental sectors, which will in turn promote the utilization of waste and the protection of the environment.

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A correlational study between self esteem and gaming behaviour.

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This study explores the correlation between gaming addiction and self-esteem among gamers in India. Utilizing the Rosenberg Self-Esteem Scale and the Gaming Addiction Screening Test, data were collected from a diverse sample of gamers across various demographics.

The primary objective is to examine the relationship between the severity of gaming addiction and levels of self-esteem. Preliminary findings suggest a negative correlation, indicating that higher levels of gaming addiction are associated with lower self-esteem. Additionally, the study investigates how demographic factors such as age, gender, and socio-economic status influence this relationship.

The results will highlight the complex interplay between gaming behavior and psychological well-being, emphasizing the need for targeted interventions. By identifying specific groups that are more vulnerable to gaming addiction, this research will provide valuable insights for mental health professionals and policymakers. The findings underscore the importance of addressing self-esteem issues as part of comprehensive strategies to mitigate gaming addiction.

This study contributes to the growing body of literature on the psychological impacts of gaming and offers a foundation for future research on effective intervention strategies. The implications of these findings extend beyond the Indian context, providing a comparative perspective for global studies on gaming addiction and self-esteem.

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Study on bacterial isolates from chaat capable of producing toxins due to unhygienic practices

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This study investigates microbial contamination in street-vended chaats in Bangalore, focusing on identifying toxin-producing bacteria. Street food is a common and accessible nutrition source in developing countries but often poses health risks due to unsanitary handling. The research addresses concerns over foodborne illnesses caused by pathogens such as Staphylococcus aureus, Escherichia coli, Bacillus cereus, and Listeria monocytogenes. Twenty-five chaat samples from various locations in Bangalore were analyzed for bacterial contamination. Bacteria were isolated using nutrient agar, identified through Gram staining and 16S rDNA sequencing, and assessed for pathogenic potential by hemolytic activity on blood agar. Antibiotic susceptibility was tested using the Kirby-Bauer disc diffusion method, and protein concentrations were measured with Lowry's method. PCR assays detected enterotoxin genes, indicating toxin production.

The study identified 33 distinct bacterial isolates, predominantly Gram-positive cocci. Hemolytic tests revealed 17 isolates with hemolytic activity, including 13 showing alpha hemolysis and 4 beta hemolysis. Antibiotic susceptibility testing showed significant resistance, with some isolates resistant to multiple antibiotics; notably, isolates S1V and S1K were resistant to eight different antibiotics. High protein concentrations were found in three isolates, all of which tested positive for enterotoxin

genes via PCR. These findings underscore severe public health risks due to the presence of multi-drug resistant, toxin-producing bacteria in street-vended chaats. The study highlights the need for improved food safety measures to mitigate risks associated with street food consumption.

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Experimental Investigation of strength parameters of concrete by partial replacement of cement by sugarcane bagasse ash.

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This study explores the impact of substituting cement with sugarcane bagasse ash (SCBA) on the strength properties of concrete, highlighting its role in promoting sustainable construction practices. SCBA, an abundant by-product of sugarcane processing, presents a viable alternative to conventional cement, which is known for its significant environmental footprint due to high carbon emissions. By partially replacing cement with SCBA, this research aims to reduce the reliance on traditional cement and utilize agricultural waste, contributing to both economic and environmental benefits. Concrete mixes were designed with SCBA replacing 5%, 10%, 15%, and 20% of the cement by weight for single M30 grade concrete with a constant w/c ratio of 0.45. The study assessed the effects of SCBA on compressive, flexural strength and tensile strengths as well as workability, with samples tested at 7 and 28 days of curing. The strength parameters are tested at different ages in accordance with Bureau of Indian Standards (BIS). The results are compared with conventional concrete.

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Preliminary Roost Assessment of Sympatric Bats in an Abandoned Temple, Gaddige Matha, Sirsi, Karnataka, India.

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Species specific roost assessment including population estimation, microclimatic conditions, and other faunal diversity in the roost helps develop protocols for bat survey for ecological impact assessment. Since few bats exhibit highly specific roosting preferences, understanding their roost characteristics is essential for developing conservation strategies. Keeping this as the main focus, the current study aims to identify bat species inhabiting an abandoned temple in Gaddige Matha, Sirsi, Karnataka, estimate their population, to analyze the microclimatic conditions of the roosting site and document other faunal diversity within the roost, providing insights into the habitat preferences of these sympatric bat species. Survey was conducted in August 2024 at Gaddige Matha, located in the Sirsi Taluk of Western Ghats. Non-invasive methods - photography and acoustic monitoring were employed to identify bat species. Populations were estimated through roost count method. Microclimatic parameters were recorded using a pocket weather meter. Other faunal species within the roost were documented via direct observation and photography. Two bat species, Rhinolophus rouxii and Rousettus leschenaultii, were identified as co-inhabitants of the Gaddige Matha. The population estimates were approximately 100 individuals for Rhinolophus rouxii and 10 for Rousettus leschenaultii. Both species exclusively occupied the inner sections of the temple, avoiding the outer, more exposed areas with only a roof. The roosting site also supported other vertebrates and invertebrates, including frogs, porcupines, Mollusca, spiders, and insects. This study provides insights about roosting

ecology of sympatric bat species. The findings contribute to understanding bat ecology, critical for their conservation.

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Tri-Phase Multi Component Functionally Graded Materials

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Functionally Graded Material is a newly emerging branch of study. Due to their distinct mechanical, thermal, and electrical characteristics, functionally graded materials (F GMs) have attracted a lot of interest lately. Tri-Phase Multi Component FGMs, a subclass of FGMs, have shown promise in tackling challenging engineering issues in a variety of sectors. This research provides a thorough analysis of current findings in the field of tri-phase multi component FGMs. It also explains the fundamental principle of FGMs and the composition, fabrication and manufacturing process of Tri-Phase Multi Component FGMs. The precursors used to make Tri-Phase Multi Component FGMs are Aluminum Nitrate Nonahydrate (ANN) Al(NO3)3.9H2O, Nickel Nitrate Hexahydrate (NNH) Ni(NO3)2 and Sodium Silicate Pentahydrate (SSP) Na2SiO3.5H2O. Moreover, this research expose the challenges and limitations of the manufacturing process of the FGMs and characterization of Tri-Phase Multi Component FGMs. It highlights the ongoing research efforts and provide insights into future direction and potential advancements in this field. Tri-phase multi-component FGMs offer unique opportunities for tailoring material properties across a wide range of applications. By harnessing the capabilities of these advanced materials, significant advancements can be made in various industries, paving the way for innovative and high-performance engineering solutions.

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Advancements in Hybrid Nanostructures Development

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The focus of research has evolved towards the development of hybrid nanostructures, featuring a combination of at least two distinct materials. This advancement aims to surpass the limitations of individual components, enhance properties, unlock new capabilities beyond what single nanoparticles can achieve, and enable the integration of multiple functionalities within a single nanoarchitecture. Various meticulously crafted hybrid nanostructures, such as core-shell, yolk-shell, heterodimer, Janus, dot-in-nanotube, dot-on-nanorod, and nanobranches, have been synthesized, showcasing the ingenuity in this field. Diverse combinations like magnetic/luminescent and plasmonic/catalytic have significantly expanded the range of functional materials and pioneered novel research frontiers in the realm of materials. The enhancement mechanism relies on the structure and optical properties of each nanocomponent, as well as their assembly technique. Therefore, strategic design, precise synthesis, advanced characterizations, and a profound understanding of structure-property relationships are all crucial in advancing highly functional hybrid nanomaterials and their practical applications in the physical world. A synergistic experimental/theoretical approach is essential to accelerate progress in this research domain, promising to revolutionize various aspects of our existence and society, from healthcare to sustainable energy and environmental conservation.

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Optimizing and Quantifying Preliminary Analysis of Sedative-Hypnotics: The Role of Spot Tests and Quantitative Thin Layer Chromatography (qTLC)

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Sedatives-hypnotics are commonly encountered in criminal cases, due to their widespread use as prescription drugs and high potential for abuse. The analysis of these drugs is carried out using preliminary spot tests and instrumental analysis for confirmation and quantification. However, there is a need for sustainability approach which can be attained through better optimization of the methods. This study integrates a review on the spot tests and quantitative thin layer chromatographic techniques, with an original work on Alprazolam, focussed on optimization of the spot test and thin layer chromatography. This paper examines the advantages and drawbacks of the spot tests and thin layer chromatography, highlighting the requirement of improvisation of these methods, which align better with Green Analytical Chemistry (GAC) principles. The findings from the study reflects an improvement in accuracy and a better reagent usage. The optimization ensures a reduction of the use of hazardous chemicals, which contributes towards sustainability and safer analytical practices. This work aligns with the United Nations Sustainable Development Goals –3 (Good Health and Well-being), 12 (Responsible Consumption and Production), and 13 (Climate Action). It further promotes reduced environmental footprint.

Keywords: Sedative-Hypnotics; Thin Layer Chromatography (TLC); Spot Tests; Green Analytical Chemistry; Method Optimization; Forensic Toxicology

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Appraisal Of Water Quality For Irrigation Suitability In Western Part Of Sandur Schist Belt, Bellary District, Karnataka State, India.

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Quality of the water is controlled by the anthropogenic impacts like growing population, industrial developments on one side and geogenic contamination like dissolved solids, fluoride, iron etc. on the other side. Because of these polluting agents, safe water quality for various purposes has become a major challenge to the consumers. From the study area, 65 representative water samples were collected from different locations and analysed for various physical and chemical parameters viz., Temperature, pH and Electrical Conductivity, Calcium, Magnesium, Sodium, Potassium, Carbonate, Bicarbonate, Chloride, Nitrate, Sulphate, Iron, Manganese, Fluoride and Total Hardness to assess the water chemistry with sodium absorption ratio, residual sodium carbonate and permeability index. The SAR classification illustrates all the samples belongs to excellent category, whereas USSL classification shows few samples fall under high salinity/ low SAR category which may be damaging the soil property in long run. Based on the RSC classification 83.08% belong to probably

safe category, 10.77% falls under doubtful category and remaining 6.15% belongs to not suitable for irrigation purposes. According to the permeability index classification, 78.46% of water samples fall under Class-II, Little Permeability Category and are allowable whereas 21.54% belongs to Class-I, No Permeability, which is unsafe.

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Advances in AI, 3D Printing, and Robotics in Construction

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This review examines the integration of Artificial Intelligence (AI), 3D printing (3DP), and robotics into the construction industry, assessing their potential benefits, challenges, and future research directions. The review synthesizes findings from three key papers: one on the adoption of AI in construction, another on AI techniques applied to 3D printing in architecture, and a third on robotic technologies for construction. The review reveals that while AI offers significant improvements in planning and efficiency, its adoption is hindered by the fragmented nature of the industry. AI's potential in 3D printing for architecture is promising but underexplored. Additionally, robotic technologies are increasingly being applied to various construction tasks, though there is a noted gap in fully integrated robotic systems for on-site construction. The review underscores the need for further research to overcome current challenges and capitalize on these technologies to advance construction practices.

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Enhancing Concrete Properties with Titanium Dioxide Nanomaterials

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In this study, a series of concrete cubes was produced by incorporating varying percentages of nanomaterials, specifically titanium dioxide (TiO2), as a partial replacement for ordinary Portland cement (OPC). TiO2 was substituted at levels of 5%, 10%, 15%, and 20% of the OPC content. Initial assessments included fundamental material examinations and evaluations of the freshly mixed concrete. Following this, compressive strength tests were conducted on the manufactured concrete cubes. The results indicated that incorporating nanomaterials enhanced compressive strength compared to conventional concrete cubes, with compressive strength increasing as TiO2 content increased. However, when the TiO2 content was raised from 15% to 20%, a decline in compressive strength was observed. Overall, compared to conventional concrete, the TiO2-enhanced concrete cubes exhibited a 10% increase in compressive strength. Durability was assessed through water absorption tests, which showed that TiO2 concrete cubes absorbed 28.4% less water compared to conventional concrete.

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Decolorization of textile dyes using fungi isolated from textile industry effluents around Bangalore

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A lot of chemicals including dyes are manufactured and are being used in day-to-day life because of rapid industrialization and urbanization. About 100,000 commercial dyes are manufactured including several varieties of dyes such as acidic, basic, reactive, azo, diazo, anthraquinone based meta complex dyes with an annual production of over 7 x 105 metric tons. Some dyes are hazardous to living organisms due to their potential toxicity and carcinogenicity. The current investigation aims at isolating fungi capable of decolorizing the textile dyes Reactive red and VAT blue. The process of enrichment of fungi capable of decolorizing the dyes was carried out by inoculation of textile industry effluents in Potato dextrose broth with respective dyes. A total of 21 isolates capable of decolorizing Reactive red and 25 isolates capable of decolorizing VAT blue were obtained after enrichment performed for 3 weeks followed by plating on solid media. The isolates were subjected to initial screening with increased dye concentration in potato dextrose broth medium. The decolorization was recorded spectrophotometrically. A total of 12 isolates; 6 decolorizing Reactive Red and 6 decolorizing VAT blue were screened out. All the fungal isolates were subject to morphological and microscopic examination. Four isolates showing highest decolorization of the dyes were identified. In further studies, these four isolates will be identified and characterized. Optimization of decolorization with respect to various parameters will be carried out. Fungal cells will be immobilized to perform bioremediation studies on a lab and pilot scale.
Key words: Textile dyes, Isolation, Screening, Decolorization, Fungi, Bioremediation.

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An overview of Internet of Things and Applications

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The recent development in wireless networking has huge impact on human life. Internet of Things (IoT), the fast growing technology offers various services that have changed the human life style from traditional way of living into technology oriented. The internet of things (IoT) is a system which consists of sensors, user, computing and communicating devices and they are able to transfer data over a network. IoT applications include Smart city, smart homes, energy saving, smart transportation, smart industries, etc. These domains have seen lot of transformations because of IoT. However, there is a need to understand and address various issues and challenges while developing IoT applications. In this article, IoT architecture and application domains, the issues and challenges are discussed.

Keywords: Internet of Things, sensors, security issues

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Dermatoglyphics- a biomarker for predicting Myopia

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Myopia is the most common refractive disorder globally. Its onset can occur at birth or during adulthood, with the cause often remaining idiopathic. This project aims to better understand the correlation between dermatoglyphics and myopia, with the goal of identifying potential predictive markers and enhancing understanding of this prevalent visual disorder. Dermatoglyphics, the scientific study of ridge patterns on the fingers, palms, and soles, offers a unique and immutable record of an individual's developmental history, influenced by both genetic and environmental factors. Given the polygenic nature and developmental stability of dermatoglyphic traits, this field provides insights into various genetic and congenital conditions, including myopia. The core of this project involves a detailed analysis of dermatoglyphic patterns in individuals with myopia compared to those with normal eyesight. Fingerprints and palm prints were taken using the traditional ink and paper method, and traits such as ridge count and fingertip patterns (loops, whorls, and arches) were meticulously examined to identify potential correlations with myopic conditions. The analysis revealed that myopic individuals exhibited a higher percentage of ulnar loops on the left little finger and a higher percentage of whorls on the right ring finger compared to those with normal eyesight. Ridge count was consistently higher, particularly on the left little finger, indicating denser ridge patterns in myopic individuals. The atd angle distribution showed no significant difference between groups. These findings suggest that certain dermatoglyphic factors may serve as biomarkers for early diagnosis and intervention in myopia.

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Development of a Novel Diagnostic Platform for Rapid Detection of Infertility-Related Genes in Azoospermic Males

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Infertility is a major public health issue in India, and azoospermia, which is an absence of sperm in the ejaculate, accounts for a significant proportion of infertility cases. Based on the available published data, 40% of infertile males had azoospermia, and 9.3% of them were carrying a genetic abnormality found via screening, highlighting the diagnostic challenges linked to male infertility. While progress has been made in genetic diagnostics, the molecular causes of azoospermia are still poorly understood, especially in cases of spermatogenic arrest, where diagnosis based on current methodologies offer limited insights.

This study aims to develop a comprehensive diagnostic platform to rapidly detect infertility related genes, specifically those located on the Y chromosome, which are important for spermatogenesis. We will explore the expression and regulation of important Y-linked genes especially of DAZ, RBMY and the AZF regions as well as the haploid specific genes reported by Arka et al(2018) in the spermatogenic arrested cells.So far, part of this work involves the isolation of control and patient blood and testicular biopsies respectively, single cell isolation from testis biopsies followed by PI staining and microscopy to give a preliminary assessment of cell viability.

The next phase will use a technique known as FACS (fluorescence-activated cell sorting) to confirm spermatogenic arrest, followed by nanopore sequencing to detect novel pathogenic mutations and variants in azoospermic patients. Nanopore technology is known for its long-read sequencing capability which enables rapid on-site diagnosis with low cost and the detection of variants and mutations that may be missed by short-read techniques. Our findings indicated that this technique holds potential for enhanced diagnostic accuracy and speed for subtyping of male infertility and for development of personalised therapeutic intervention.This research contributes to the development of a novel diagnostic tool enabling more effective clinical management strategies towards treatment of male infertility through accurate genetic profiling and early intervention.

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Assessment Of Knowledge, Attitude, And Practice Of Mothers/Caregivers On Child Feeding Practices Among The Chakhesang Naga Tribe Of Northeast, India

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Background: Adequate nutrition for children is crucial for sound physical and mental development. Nevertheless, evidence indicates that children in developing nations lack optimal feeding, undermining their capacity to grow and develop to their full potential.
Aims and objectives: We assessed the knowledge, attitude, and practice of the mothers/caregivers on infant and young child feeding (IYCF) practice in the Chakhesang Naga Tribe of Nagaland.
Methods: A cross-sectional study was conducted among 445 mothers/caregivers in 9 villages from the Chakhesang tribe in the Phek district of Nagaland. Data was collected using a structured questionnaire administered separately to mothers/caregivers of children 0-5, 6-23, and 24-59 months. Descriptive statistics, bivariate analysis, and logistic regression were employed to present the study result.
Results: The study shows that 98.8% of the children were breastfed, however only a quarter of children 6-23 months are exclusively breastfed. Only one-third of women with children aged 0-5 months have good knowledge and practices towards IYCF, however, two-thirds have positive attitudes. Around 19% and 28% of women with children aged 6-23 months have good knowledge and practices, whereas 60% of mothers have positive attitudes. Half of women with children aged 24-59 months have good knowledge and practices towards diets of pre-school children and 55% of women have positive attitudes. Logistic regression analysis indicates that higher maternal education and wealth status significantly influence knowledge of Infant and Young Child Feeding (IYCF) practices.
Conclusions: The finding suggests that these tribal women have limited knowledge regarding infant and young child feeding practices although they generally had a positive attitude. Nutrition programs should prioritize equipping mothers with recommended guidelines for feeding infants and young children.
Keywords: Knowledge, Attitudes, Practices, Infant and young child

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A Comparatives Analysis Between Iq Of Individuals With Myopia And Normal Vision

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This study investigates the relationship between visual acuity and intelligence quotient (IQ) in adult individuals by comparing those with normal vision (emmetropia) and those with myopia (nearsightedness). The research aims to explore whether there are significant differences in IQ scores between these two groups and to understand the potential underlying factors contributing to any observed disparities. A sample of adult participants, was assessed using standardized IQ tests. Data analysis involved statistical comparisons of IQ scores, controlling for variables such as, gender, Myopic and normal vision. The findings are expected to provide insights into the cognitive profiles associated with different visual conditions, contributing to the broader understanding of the interplay between sensory functions and intellectual capabilities. This research shows the relation between IQ of normal visioned (Emmetropia)and IQ of people with Myopia.

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Effect Of Rare Earth Metals On Alpha-Beta Esterase Activity And Glutathion Levels In Drosophila

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Rare-earth elements (REEs) consist of a group of 17 elements on the periodic table, comprising the 15 lanthanides as well as yttrium and scandium. Rare-earth elements (REEs), including neodymium, play a critical role in modern technology due to their unique magnetic, phosphorescent, and catalytic properties. Neodymium, in particular, is commonly used to create NdFeB magnets, essential components in various devices such as microphones, earbuds, and computer hard drives. This study investigates the effects of neodymium oxide on α- and β-esterase activity and glutathione transferase in both larval and adult stages of Drosophila melanogaster, a widely used model organism in biological research. The test samples were grouped into 3 categories based on exposure to Neodymium oxide metal with various concentration, along with control. Larvae of the F0 generation were supplemented with neodymium oxide at concentrations of 0.03 mg/ml, 0.04 mg/ml, and 0.05 mg/ml.
The biochemical Esterase activity was assessed using α-naphthyl acetate and β-naphthyl acetate, with colour intensity measured at 605 nm for α-esterase and 555 nm for β-esterase. The experiment was followed by glutathione transferase estimation which was performed on both the larva and adult form of Drosophila melanogaster. The diluted samples were treated with GSH and observed the readings at absorbance 340nm in a spectrophotometer and statistically analysed the mean value through one-way ANOVA, Tukey's HSD by using SPSS. Statistical studies resulted in significant reduction of glutathione transferase and α and β Esterase activity and between group with that of control.
As Drosophila and vertebrates share similar mechanisms involved in the induction of developmental defects in both, Drosophila has been proposed as a useful, rapid, and economical model in the preliminary screening for teratology studies. This study shows that Drosophila species exposed to different doses of common antiepileptic drug Neodymium oxide led to reduction in viability with increased doses. The phenotypic changes that arose in response to drugs, elucidate the underlying initial biochemical effects and cellular receptors involved in the toxicity and teratogenicity of REE in Drosophila .

Key words: Drosophila melanogaster, REE, Neodymium, Glutathione transferase, α and β Esterase, ANOVA, Teratogenicity

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Socio-Cultural Beliefs Influence the Dietary Practices of Mothers and Children in The Chakhesang Tribe of Northeast India

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Introduction: In the pre-Christian era, cultural taboos, prohibitions, and restrictions were cautiously adhered to due to the fear of supernatural consequences. However, even after adopting Christianity, these practices were not entirely eradicated, although they dwindled. The paper examines the extent to which socio-cultural beliefs on feeding practices persist in the face of changing societal dynamics.

Methods: A quantitative study was conducted among 445 mothers/caregivers of children under 5 years old. In addition, a qualitative study with 9 key informants and 18 in-depth interviews was conducted with mothers from 9 villages in Phek district, Nagaland. The study results were presented using descriptive statistics, bivariate analysis, and qualitative analysis with an inductive approach.

Result: The study reveals that although 98.8% of children aged 6-23 months are breastfed, only a quarter are exclusively breastfed. At 6 to 7 months old, infants are introduced to rice porridge, which is organically grown, and rich in carbohydrates. 9.6% of mothers responded that food taboos exist during pregnancy and 92% of women have diet restrictions during pregnancy. Women follow a stern diet during pregnancy, certain foods like bananas, honey, crab, and fish are restricted to avoid complications during pregnancy and delivery. Post-delivery mothers are strictly advised to consume only non-vegetarian food to aid post-delivery recovery and boost breast milk production. Most mothers continued to adhere to cultural beliefs, leading them to neglect nutrient-rich foods. However good practices such as keeping the infant warm, consuming locally grown food, and strong community bonding during childbirth kept the mother and child healthy.

Conclusion: Educational interventions are necessary to enhance awareness about the negative impact of certain socio-cultural practices on maternal and child health. Whereas positive and negative dietary practices of mothers and children influenced by cultural factors should be considered for further nutrition programs.

Keywords: Indigenous, Tribes, Food, Restriction, Children

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Synthesis, characterization, and in silico studies of some thiazoles

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Herein, we synthesized thiosemicarbazones using different aldehydes and thiosemicarbazide followed by hydrazinyl thiazole derivatives using different phenacyl bromide substituents. The synthesized thiosemicarbazones and hydrazinyl thiazole derivatives were confirmed through various spectroscopic techniques like FTIR, 1H NMR, and mass spectrometry. Molecular docking studies were performed using docking tools to assess the binding interactions of thiosemicarbazones and hydrazinyl thiazole derivatives with the target protein, Human Serum Albumin (HSA). The results obtained from docking studies elucidated the binding mechanism of thiosemicarbazones and hydrazinyl thiazole derivatives exhibited a binding constant range from -4.73 Kcal/mol to -9.50 Kcal/mol. Amongst them, (E)-2-((2-(4-(2-chlorophenyl) thiazol-2-yl) hydrazono) methyl)-5,6-dihydroimidazo[2,1-b] thiazole showed a maximum binding constant. Additionally, Density Functional Theory (DFT) calculations were carried out using Gaussian Software to investigate the electronic properties and ADMET analysis was carried out to evaluate the drug-like properties of the synthesized hydrazinyl thiazole derivatives.

Keywords: Thiosemicarbazones, Hydrazinyl thiazole derivatives, Molecular docking, DFT calculations, and ADMET analysis.

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Molecular Docking, ADMET and DFT studies of selected anticancer drugs

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We selected three different available anticancer drugs in the market and studied their nature of binding to the carrier protein, Human Serum Albumin (HSA) followed by ADMET parameters and Density Functional Theory (DFT) calculations. The selected drugs were (i) vimentin-1N-1 (ii) 4-[4-(2-methoxy phenyl)piperizine-1-yl)cinnoline and (iii) 8-chloro-4-[3-(trifluromethoxy)phenyl]piperizin-1-yl]cinnoline. The molecular docking studies were carried out by Autodock tool. Similarly ADMET parameters of the selected drugs were evaluated by Molinspiration tool while the toxicity was determined by pkCSM online software. The molecular docking is a computational approach which provides an insight into binding profile of selected anticancer drugs through ligand-protein interactions. The binding scores of selected drugs were found to be -8.05 Kcal/ml for (i), -7.77 Kcal/ml for (ii) and -7.90 Kcal/ml for (iii). The values of binding scores indicated that the drug (i) vimentin-1N-1 binds to HSA with highest affinity. The Density Functional Theory (DFT) calculations were carried out by Guassian software to find the electronic structures of selected anticancer drugs. The TD-DFT calculation helps to find the different reactivity parameters, which is significant to understand the chemical nature of the compounds.

Keywords: Molecular docking, ADMET, DFT, Anticancer drugs

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Decolorization of Acid violet 43 and Direct Orange 7gL using Bacillus pacificus isolated from textile industry effluent of Bangalore

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This investigation was taken up to study the decolorization of the textile dyes, Direct Orange 7gL and Acid violet 43 using bacteria isolated from textile industry effluent of Bangalore. Enrichment, isolation and screening of dye decolorizing bacteria was carried out using Bushnell Hass medium. A total of 8 isolates capable of decolorizing both Acid violet 43 and Direct Orange 7gL were screened out. The isolate capable of showing considerable decolorization of both the dyes was identified as *Bacillus pacificus* using 16S rRNA gene based molecular method. Optimization of decolorization of the dyes with respect to various parameters was carried out with one factor at a time approach. Optimum decolorization of Acid violet 43 was recorded at a pH of 7, temperature 35℃, dye concentration of 4%, shaking speed of 150 rpm, inoculum concentration of 2 mL and 100 mg/L each of glucose and yeast extract. For Direct orange 7gL, the optimized conditions were a pH of 9, temperature of 35℃, dye concentration of 4%, shaking speed of 100 rpm, inoculum concentration of 2 mL, 200 mg/L of maltose and 100 mg/L peptone. A comparative analysis of the decolorization of Acid violet 43 and Direct Orange 7gL under unoptimized and optimized conditions using *Bacillus pacificus* was carried out. The results showed a marked increase in decolorization under optimized conditions. In further studies, statistical optimization was carried out using Response surface methodology.

Key words: Decolorization, Acid violet 43, Direct Orange 7gL, optimization, Bacillus pacificus

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Classification and detection of Heart Disease in normal patients using Machine Learning –A Model Approach

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Heart disease is the leading cause of death worldwide, with a rate of 237.9 per 100,000 people in 2024. According to the 2023 report Global Burden of Disease (GBD) published in the Journal of the American College of Cardiology. The study also estimates that the age-standardized CVD death rate of 272 per 100,000 population in India is higher than the global average of 235 per 100,000 population, which means India has a higher CVD burden.
Things like diet, exercise, calcium and smoking greatly influence this risk.
Diagnosing heart conditions using visual images from angiography techniques involves examining images of blood vessels to identify problems. To improve heart disease diagnosis from symptoms, using machine learning techniques can help make it more accurate. Image processing algorithms help find and measure coronary artery disease by looking at plaque buildup, narrowed arteries, and other issues.
New machine learning tools are making predictions more accurate by looking at personal details and health history. The issue is worse in poorer countries, showing the need for specific health programs.
This abstract combines insights from various studies that have used different datasets, including those from the Cleveland Clinic and the UCI Machine Learning Repository.
The dataset used in this paper is Cleveland Clinic and the UCI Machine Learning Repository, which contains 14 features. Utilized these datasets comprising clinical variables such as age, blood pressure, cholesterol levels, and more.
The aim of this research is to classify heart disease in normal patients using a machine learning model approach.
Keywords: AI, Dataset, Image Processing, Machine Learning

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Family Functioning and Quality of Life in Caregivers of Alcohol Use Disorder Patients: Mediating Role of Caregiving Appraisal

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Background: Family caregivers of individuals with alcohol use disorder (AUD) often face significant stress, negatively impacting their quality of life (QoL). In their stress-coping model of caregiving, Szmukler et al. (1996) defined the experience of caregiving (EoC) as an appraisal of caregiving demands, encompassing both negative (ECIN) and positive (ECIP) aspects. According to the model, family functioning (FF) influences EoC, affecting caregivers' well-being.
Objective: This study aimed to investigate the effects of FF on ECIP and ECIN and the mediating roles of ECIP and ECIN in the relationship between FF and QoL of caregivers.
Materials and Methods: A cross-sectional study was conducted at two psychiatric hospitals in Amritsar, Punjab, using purposive sampling. Data were collected from 128 family caregivers of individuals with AUD, utilizing the WHOQOL-BREF, Family Assessment Device, and Experience of Caregiving Inventory. Data were analyzed using descriptive statistics and mediation analysis using Smart PLS4.
Results: Skewness (-0.233 to 0.377) and kurtosis (-1.116 to -0.497) indicated normal distribution for all variables. Mean scores were 84.13 (QoL), 33.80 (ECIP), 90.07 (ECIN), and 127.18 (FF), suggesting moderate levels of QoL, positive and negative caregiving appraisals, and family functioning. FF significantly predicted ECIP (β = -0.652, $p < .001$) and ECIN (β = 0.651, $p < .001$), linking better family

functioning to more positive and fewer negative caregiving appraisals. Mediation analysis showed ECIP (β = -0.222, p < .001) and ECIN (β = -0.271, p < .001) fully mediated the FF-QoL relationship. The total indirect effect was significant (β = -0.493, p < .001), with a non-significant direct effect (β = -0.138, p = 0.067). The model explained 66% of the variance in QoL.
Conclusion: Family functioning significantly impacts positive and negative caregiving appraisals, which further fully mediate the relationship between FF and QoL. Improving family functioning may enhance caregivers' QoL by fostering positive appraisals and reducing negative ones, highlighting the importance of promoting healthy family dynamics in caregiver support interventions.

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Ananas comosus Waste Repercussion on Kidney Stones (Calcium Oxalate)

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Nephrolithiasis, commonly known as kidney stone is a globally health care issue prevalent for a lifetime. They are composed of calcium oxalate in combination with calcium phosphate, uric acid, struvite and cystine. Development of disease is by infections, family history, consumption of less water, obesity, food with excess salt, too much or too little exercise. The increasing demand of Ananas comosus, commonly known as pineapple results in 40-50 % of agricultural waste, improper handling of which leads to landfill in the environment releasing greenhouse gases. The pineapple waste (stem, peel, crown, core, leaves) containing crude fibre, non-reducing sugar, protein, malic acid, ascorbic acid, which are used as substrates for citric acid production using Aspergillus niger. Citric acid is a low-cost feedstock popularly used in biopharma downstream processes. Citric acid binds with urinary calcium results in reducing supersaturation of urine, as well binds with calcium oxalate crystals prevents crystal growth which inhibits kidney stone formation

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Digital Identity Using Blockchain : A Review

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Blockchain is defined as an immutable ledger for recording transactions in a verifiable and permanent way, maintained within a distributed network of mutually untrusting peers. Every peer maintains a copy of the ledger. The peers execute a consensus protocol to validate transactions, group them into blocks, and build a hash chain over the blocks. This process forms the ledger by ordering the transactions, as is necessary for consistency. Blockchain technology was introduced by Satoshi Nakamoto (presumed pseudonymous person or persons)for his popular work of digital currency or crypto-currency, i.e., Bitcoin. Nakamoto used Blockchain technology to solve the double spending problem of Bitcoin but soon this novel technology was being used in many other applications.

Governments around the globe are some of the entities that are leading the digital transformation through digital identity. The adoption of Blockchain technology for digital identity solutions helps to empower citizens and build a more connected digital society. This Paper reviews the use of digital identity using Blockchain Technology.

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Synthesis, characterization, and in silico studies of pyrrole-coupled with some phenacyl bromide derivatives

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Pyrrole is an important nitrogen-containing aromatic heterocycle that can be found in numerous compounds of biological importance. Given its vast importance, pyrrole continues to be an attractive target for the development of new synthetic reactions. Hence, we synthesized pyrrole-coupled with some phenacyl bromide successfully and all the synthesized compounds were structurally elucidated using various spectroscopic tools including FTIR, 1H NMR and mass spectrometry techniques. In addition, the optimal structure of the produced molecules was determined by Density functional theory (DFT) computing. Molecular docking studies were performed to assess the binding energy and elucidated the interaction between the potential candidates and Human Serum Albumin (HSA) using the AutoDock tool. The binding constant range of the synthesized compounds was found to be in the range of -9.76 to -8.24 Kcal/mol, wherein the molecule (E)-2-(2-((1H-pyrrol-2-yl) methylene) hydrazinyl)-4-(4-methoxyphenyl) thiazole exhibited a strongest binding constant. ADMET analysis was carried out to assess the absorption, distribution, metabolism, excretion, and toxicity of the synthesized compounds. ADMET analysis was carried out using the Molinspiration tool. The toxicity was determined by pkCSM online software. The proposed research work helps to identify the potential drug candidates by predicting the binding affinity of small molecules to a protein and their ADMET parameters.

Key words: Pyrrole, phenacyl bromide, spectroscopic tools, DFT, molecular docking, ADMET.

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Production of Bioplastic from microalgae

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There is a great need for developing bioplastic that is sustainable and eco-friendly. Microalgae isolated from freshwater sources such as lakes are a promising option for production of bioplastic due to their high lipid content. The suitable microalgae is isolated and screened from local freshwater lakes and it is then grown in enrichment algal media. Quantitatively the growth of microalgae in the media is determined spectrophotometrically and using a haemocytometer.Qualitative estimation of bioplastic is done using HPLC or Sudan Black Dye test for lipids. Extraction and purification is conducted using centrifugation and treatment with plasticizers such as glycerol, making a blend of bioplastic composite. Further investigation for possible refinements on production methods, efficiency, extraction, purification and physical properties is researched. This is undertaken with the main aim of promoting sustainable development and a greener economy. By researching various accessible and cost effective methods for revalorization of available algae in bioplastic production, the results can be extrapolated into industrial levels and essential data revealed on the practicality of lakewater algae in the bioplastic market.

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Analyzing Crimes Against Women in India: A State-Wise Study (2001-2021)

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This project focuses on the analysis of crimes against women in India from 2001 to 2021 using Power BI. The dataset provides a comprehensive view of various crimes, including rape, kidnapping and assault, dowry deaths, and other forms of violence against women, across different states over the last two decades. By employing data visualization techniques, this project aims to uncover significant trends and patterns in the incidence of these crimes, highlighting the geographical and temporal distribution of violence against women in India.

The analysis reveals the states with the highest and lowest crime rates, identifies trends over time, and uncovers outliers that may indicate areas of concern or improvement. The visualizations created in Power BI offer a clear and impactful representation of the data, making it easier for policymakers, researchers, and the public to understand the scope of these crimes and take informed action.

This project not only demonstrates the power of data visualization in revealing insights from large datasets but also serves as a critical tool in the ongoing fight to protect and empower women in India.

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Machine Learning-Driven Analysis of MXene Research: Trends, Applications, and Future Directions in 2D Materials

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The growing demand for sustainable materials has intensified the research into Two-dimensional materials, with MXenes emerging as a promising material across various industries due to their exceptional properties. 2D materials have been in the research spotlight from past decades due to their unique physical and chemical properties. They attracted significant interest in various domains such as energy storage, sensing, catalysis and many more due to their large surface area, electron confinement, and unique morphology. In this study, author has reviewed approximately 2000 papers from past one decade published on MXenes with various material composition and applications. Utilizing AI tools and advanced machine learning techniques, author has made in-depth analysis by processing and clustering research abstracts allowing for the extraction of patterns and trends in MXene research.
Clustering has been done based on material composition, such as transition metals in the place of M and non-metals in the place of X with their applications in various domains. In particular, sensor applications including biosensor, chemical sensor, gas sensor, optical sensor, pressure sensor have been analysed in detail. Based on the analysis, author has highlighted key trends, such as the increasing applications of MXene hybrids in enhancing optical and catalytic properties. Compositions like Titanium, Niobium, Tantalum transition metals with carbide or nitride were most often used focusing on high-performance energy storage, environmental remediation technologies and sensing. This analysis and visualization approach has enabled us to identify emerging areas, providing insights

into the future direction of research on MXene materials. Overall, our review and findings highlight the growing potential for future research on MXenes materials in cutting-edge applications.

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Role of Topology in Nanopillars and Its Effects on Performance On CdS/CdTe Solar Cells

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Abstract—To investigate the influence of nanostructure topologies on a fixed substrate solar cell dimension, a comparative study was conducted using TCAD Silvaco software under AM 1.5 illumination conditions for CdS/CdTe solar cells. Various nanopillar structures, including nano-tri-pillars, nano-quad-pillars, nano-penta-pillars, nano-hexa-pillars, and nano-cylindrical pillars, were simulated. While the pillar height and radius remained constant, the aspect ratio variations among these structures resulted in distinct performance outcomes in the solar cells.

Keywords: CdS/CdTe solar cell, nanopillar structure, Topological effect, photovoltaic performance, charge transport.

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Surveillance of antimicrobial resistomes in wastewater treatment plants (WWTPs) using a metagenomic sequencing approach

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Antimicrobial resistance (AMR) poses a critical global health threat, with wastewater treatment plants (WWTPs) acting as key reservoirs for resistant pathogens. In India, these facilities often harbor dangerous antibiotic-resistant bacteria, including Methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin-resistant *Enterococci* (VRE), and carbapenem-resistant *Enterobacteriaceae* (CRE). This study aims to identify prevalent AMR genes and pathogens in WWTP samples and develop a metagenomic sequencing-based surveillance method. Wastewater samples were collected from several WWTPs in Bengaluru, India, and subjected to DNA isolation and PCR amplification targeting eight AMR genes as well as the 16S rRNA gene. The presence of these AMR genes was confirmed in the wastewater samples. We used AMR bacteria, including *E. coli*, MRSA, and *Klebsiella pneumoniae*, to validate our detection protocol, obtained from hospital culture samples. The successful identification of these pathogens demonstrated the effectiveness of our method. Further nanopore sequencing validation is ongoing, promising a comprehensive and rapid approach to environmental AMR monitoring.

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Landmark Analysis of Time-to-Event Data: Unveiling Earthquake Patterns and Risks

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Natural disasters, such as earthquakes, have a significant impact on both the environment and on humans. They frequently cause extensive ecological damage and interrupt essential services like clean water and sanitary facilities. Improving disaster preparedness and resilience in vulnerable areas requires an understanding of the patterns and time intervals between seismic events. This study focuses on the application of survival analysis to assess the time between consecutive earthquakes, offering deeper insights into seismic risks.

Survival analysis, particularly using methods such as **Kaplan-Meier** estimation and hazard curves, is employed to **analyze time-to-event data**—specifically the intervals between earthquakes. These models help in estimating the likelihood and timing of future seismic activity. In regions prone to frequent earthquakes, survival models can provide essential predictions about aftershocks and long-term seismic risks, helping authorities allocate resources more effectively.

By applying real-world earthquake shaking intensity data, the study uses landmark analysis to focus on specific time points where the risks of subsequent earthquakes are higher. The combination of traditional **Kaplan-Meier** methods and **landmark analysis** allows for more precise forecasting of seismic events. These insights aim to contribute to the development of sustainable policies for environmental conservation and disaster risk management, ensuring better preparedness and resilience in regions facing recurrent earthquakes.

Keywords: Earthquakes, Survival Analysis, Kaplan-Meier Estimation, Landmark Analysis

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Survival Probabilities of COVID-19 Patients: Insights from Length of Hospital Stay

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The ***COVID-19*** pandemic has posed significant challenges to healthcare systems worldwide. Understanding the factors influencing patient outcomes, particularly survival rates, is crucial for effective management and resource allocation. This study focuses on the estimation of survival probabilities for patients hospitalized due to COVID-19, specifically analyzing the ***length of stay*** in Intensive Care Units (ICUs) with a focus on patients requiring ventilator support.

Using survival analysis techniques such as the ***Kaplan-Meier***, Weighted Kaplan-Meier, and Reverse Kaplan-Meier methods, this study analyzed time-to-event data from ***NIMHANS Hospital***, focusing on COVID-19 patients. The dataset included critical variables like age, comorbidities, gender, blood pressure, sugar levels, and oxygen levels. Non-parametric methods were employed for their flexibility and accuracy without assuming a specific distribution. Results revealed significant associations between survival and factors such as age, comorbidities, and oxygen levels, with Kaplan-Meier curves effectively illustrating survival probabilities across different subgroups. The analysis also highlighted the importance of handling censoring to ensure unbiased survival estimates. The findings emphasize the need for personalized care and continuous monitoring of key health indicators in ICU settings, offering valuable insights for future research and strategies aimed at improving patient

outcomes during pandemics and other health crises.
This research contributes to the growing body of knowledge on COVID-19 survival analysis, providing evidence-based guidance for clinical practice and public health interventions.

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Silica infused regenerated banana pseudo stem fiber: A sustainable materials Approach

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Abstract
India leads the world in Musa paradisiaca (banana) production, with an annual output of approximately 14.2 million tonnes. Other major banana producers include Brazil, Ecuador, China, the Philippines, Indonesia, Costa Rica, Mexico, Thailand, and Colombia. However, there is a problem associated with banana production: around 60% of the banana crop is discarded or composted after harvesting, leading to waste management challenges. To address this issue, a sustainable approach has been proposed.
The incorporation of silica in to regenerated cellulose is a notable improvement for the production of composite materials with improved mechanical, thermal and functional properties. The object of this work concerned the incorporation of silica nanoparticles into the regenerated cellulose, with the goal of obtaining new composite that combines the enhanced performance characteristics. Cellulose which is regenerated due to its biodegradability, flexibility and biocompatibility as well as the ability to dissolve in different liquids was compounded with silica which is known for its thermal stability, mechanical strength, and low coefficient of thermal expansion. The preparation process involved dissolution of cellulose in appropriate solvent then mixing of silica nanoparticles either through in-situ sol-gel technique or direct addition. These cellulose composites containing silica give better performance in many fields such as filtration membranes, biomedical scaffolds, and packaging materials. The enhanced properties and functionalities of the silica-infused regenerated cellulose make it possible to use as a versatile base material for various industries and biomedical fields while offering the complimentary characteristics of both the organic and inorganic parts of the material.

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Influence of Dy^{3+} Doping on the Photocatalytic Efficiency of $NiCr_2O_4$ Nanocatalysts for Water Purification

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The development of nano-photocatalyst to tackle the ongoing water purification as well as organic die degradation issue is the major concern to the research community today. In our present study, Dy^{3+} doped $NiCr_2O_4$, $(Dy_xNi_(1-x)Cr_2O_4$; x =0, 0.005, 0.01, 0.015, 0.02, 0.025 & 0.03) nanocatalysts were prepared through solution combustion method using Isoleucine as a fuel. XRD results shows that formation of double-phase $NiCr_2O_4$ nanoparticles with impurity nanoparticles Cr_2O_3. With increase in the dopant concentration, average size of nanoparticle was found to be 23 nm

for pure and decrease with increase in the dopant concentration. Also, band gap was found to be constant except 1.5 and 3 mol% doped nanomaterial. It is worth noting that ($NiCr_2O_4$) nanoparticle demonstrate a significant photocatalytic activity against the Methylene Blue (MB) dye under visible light, although the bandgap increases with increase in the Dy^{3+} concentration. Notably, 3 mol% Dy^{3+} doped nickel chromite achieves 75% degradation efficiency of Methylene Blue in 18 min under visible light due to increase in the surface area, increased active sites and reduced photogenerated charge carrier recombination. The photocatalytic dye degradation mechanism highlights the role of dye sensitization in emphasising visible light photocatalytic activity for Dy^{3+} doped $NiCr_2O_4$, which primarily absorbs in the UV region. The method is based on the effective transport of electrons from the excited dye to the photocatalyst, which results in the creation of reactive species that drive pollutant degradation.

Keywords: Dy^{3+} doped $NiCr_2O_4$; Band gap engineering; Water Purification, Methylene Blue; Photocatalysis.

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Carbon Dioxide Sequestration Potential Of Tree Species Inhabiting The Botanical Garden Of Mangalore University Campus

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The carbon dioxide sequestration potential of 469 trees belonging to 70 species and 32 families was estimated in the Botanical garden of Mangalore University. The measurement of girth at breast height and approximate height were documented to measure the amount of carbon sequestration. The total biomass documented in the study area is 186,307.3 kg/m³, comprising above-ground biomass of 147,862.9 kg/m³ and below-ground biomass of 38,444.36 kg/m³. The total carbon sequestered in tree species is found to be 341.52 tonnes. The species found to have the highest carbon sequestration potential is *Terminalia paniculata* with 60,919.542 kg followed by *Pterygota alata*, *Acacia auriculiformis*, and *Pterospermum acerifolium* with 54,422.901, 29,108.145, 24,983.196 kg of CDS (Carbon dioxide sequestrated) respectively. The lowest is *Canarium strictum* which is found to sequester 47.054 kg of CDS. *Acacia sp.* despite of its greater carbon sequestration potential is not preferable or desirable because of its detrimental effects on biodiversity. With reference to IUCN conservation status, it is evaluated that the study area has a total of 5 critically endangered, 4 endangered, 4 near threatened and 11 vulnerable tree species and about 13 endemic tree species of Western Ghats.

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Digital Reminders for Well-Being: Impact on Happiness and Life Satisfaction

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In the era of digital sustainability, the integration of technology into daily life presents new opportunities to enhance mental health. This study examines the impact of daily digital mental health reminders on well-being, specifically focusing on happiness and life satisfaction. Using a mixed-methods approach, we engaged 60 participants in a 20-day intervention where daily notifications —comprising positive affirmations, self-care tips, and mental health reminders—were delivered via

Google Calendar. The Subjective Happiness Scale (SHS) and the Satisfaction with Life Scale (SWLS) were employed in a pre-test and post-test design to quantitatively measure changes in happiness and life satisfaction. Additionally, qualitative feedback was gathered through open-ended surveys to explore participants' experiences with the intervention. The results indicate a significant improvement in both happiness and life satisfaction, underscoring the potential of simple digital tools in promoting mental well-being. This study contributes to the growing body of literature on the role of technology in sustainable mental health practices, offering insights for future digital interventions aimed at enhancing life satisfaction.

Keywords: Digital Sustainability, Mental Health, Daily Reminders, Happiness, Life Satisfaction

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Gene mapping of few selected putative behavioural genes from Apis mellifera using in silico approach

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Social organisms such as mammals (mice, monkeys, and humans) and insects (honeybees, wasps, ants, and mites) depict a higher level of social interactions and therefore, these animals are widely used to study the biological mechanism of social behaviour. Among them, Apis mellifera is one of the eusocial insects that depicts different social behaviour such as mite-grooming, mating, aggressive, defensive, and foraging behaviour. To explore the role of these genes in the behavioural regulation, in the present study, few selected behavioural genes were mapped onto respective chromosomes of Apis mellifera. For this study, sequences of few selected behavioural genes associated with two main behavioural traits viz: (i) defensive and (ii) mite grooming were retrieved using BeeBase database. The distance in centimorgan (cM) between few selected putative behavioural genes was calculated (scale used: 52 Kb = 1 cM) for mapping these genes onto respective chromosomes of Apis mellifera using MapInspect software. Chromosomal mapping has mapped few selected brain-related genes such as serotonin, atlastin, nexin, and ataxin variants onto chromosome 2, 3, 7 and 5, respectively. The close proximity of these genes on respective chromosomes exhibits linked association among them during regulation of defensive and mite grooming behaviour.
Keywords: Social behaviour, Apis mellifera, Behavioural genes, BeeBase, MapInspect, Centimorgan

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Technological Innovation In Digital Payments: A Survey Of Trends, Challenges, And Opportunities.

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This paper critically examines the impact of technological innovations, particularly in the areas of financial technology (FinTech), artificial intelligence (AI), and machine learning (ML), on digital payments. The aim is to analyze how these advances have transformed traditional payment systems to improve transaction efficiency, reduce costs, and allow real-time analysis, making them essential components of the modern financial ecosystem. In addition, the study explores the crucial role

of digital payments in promoting financial inclusion, especially in regions where the banking infrastructure is underdeveloped while addressing the current challenges in rural and remote areas. The economic impact of the widespread adoption of digital payments is significant, contributing to growth and productivity, especially in emerging markets. However, the rapid pace of technological advancement has also brought new challenges regarding regulation, security, and data privacy. The article concludes by highlighting the importance of robust cybersecurity measures, adaptive regulatory frameworks, and policies that promote digital inclusion. As digital payments continue to evolve, it is essential to address inequity and create a fair financial system that benefits everyone, especially in light of growing security concerns and the potential disruption caused by emerging technologies such as blockchain and finance decentralized (DeFi).

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Development Of An Online Retail Recommendation System

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The development of an online retail recommendation system aims to enhance the shopping experience by providing personalized product suggestions to users. This project addresses the problem of information overload in e-commerce, where customers often struggle to find products suited to their preferences. The system detects highly recommended products based on customer behavior and preferences by leveraging historical data about online retail transactions. The primary objectives are implementing collaborative filtering, content-based filtering, and hybrid recommendation techniques to improve accuracy. Additionally, customer segmentation models are employed to categorize users into distinct groups based on their purchasing patterns, further refining the recommendation process. Using a dataset of online retail, and applying advanced data preprocessing and machine learning algorithms to build and evaluate both customer segmentation and product recommendation models. The results demonstrate a significant improvement in customer satisfaction and sales conversions. This project highlights the potential of recommender systems in transforming online retail by making the shopping experience more intuitive and customer-focused.

Keywords: Recommendation System, E-Commerce, Collaborative Filtering, Content-Based Filtering, Customer Segmentation, Machine Learning

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Environmentally safe novel procedure to extract soluble dietary fibers from medicinally significant seeds and their application in popular FMCG food products

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Dietary fibers are an integral part of our diet that our body cannot easily digest or absorb. They escape the digestion process since they cannot be completely broken down by the digestive enzymes. The total dietary fibers consist of complex carbohydrates and can be classified into soluble (SDF) and insoluble dietary fibers (ISDF). The process of extraction of these fibers are hazardous to the environment since they use harmful solvents and chemicals. Through our study, we have isolated SDFs through an environmentally safe proprietary enzymatic procedure, delivering an SDFs yield of approximately 20%, significantly higher than the current methodologies (maximum recorded yield

of 14.59%). Herein, we have developed SDFs-enriched cookies, breads, and cakes, which we claim assists in digestive health and helps maintain good gut health. Fibers are known to help regulate the body's sugar absorption and we aim at expanding the SDFs application to other FMCG products

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Utilizing Wolbachia-Infected Mosquitoes for Sustainable Dengue Control

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Dengue is a viral disease spread primarily by mosquitoes in tropical and subtropical regions. It is caused by four different serotypes of the dengue virus (DENV-1 to DENV-4), with Aedes aegypti and Aedes albopictus mosquitoes being the main carriers. The illness can be evident in various forms, from the relatively mild dengue fever to more severe conditions such as Dengue Hemorrhagic Fever and Dengue Shock Syndrome. Traditional dengue control efforts have relied heavily on insecticides. However, the growing resistance among mosquito populations has significantly reduced the effectiveness of these chemical treatments. This has led to an exploration of alternative strategies, one of which involves the use of Wolbachia pipientis, a bacterium that, when introduced into mosquito populations, inhibits the replication of dengue viruses. Wolbachia induces cytoplasmic incompatibility in mosquitoes, which decreases their ability to reproduce and shortens their lifespan, thereby curbing the spread of the virus. Field experiments in countries like Australia and Indonesia have shown a notable reduction in dengue cases following the release of mosquitoes infected with Wolbachia. While this approach holds promise, it is not without challenges, such as potential ecological consequences, ethical considerations, and the need for careful public engagement. Despite these concerns, the use of Wolbachia-infected mosquitoes presents a potentially sustainable and effective method for controlling dengue and other mosquito-borne diseases. Ensuring the long-term success of this strategy will require ongoing research, monitoring, and active involvement from the community.

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Physico-Chemical Analysis Of Wines And Their Economics Produced From Fruits And Vegetable Wastes

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Organic wastes from banana peel, beetroot peel, and pineapple peel were used in the production of wine by utilizing their natural sugar and other nutrients. The present study was carried out for the evaluation of physico-chemical and sensory parameters of wines and their economics of wine production. Table wine was produced from juice extracted from washed peels of banana and pineapple

fruits and beetroot vegetable, inoculated with *Saccharomyces cerevisiae* for fermentation for 21 days. The proximate composition and the physico-chemical analysis of fermented wine samples like pH, specific gravity, alcohol, protein, vitamin C, carbohydrate, ash, moisture, fat, phenol contents were carried out using standard procedure. Wine was analyzed for the quality analysis such as residual sugar, tartaric acid, chloride, calcium and citric acid content. All the values recorded for quality evaluation and physico–chemical analysis parameters fall within the standard acceptable ranges. In addition, the potential for revenue generation was also analyzed. The profit gained for 1 quintal of peel wastes of banana, pineapple and beetroot used for wine preparation @ Rs. 300/750ml were 20,056, 20,268 and 8,237 rupees respectively. In this study, a better and more profitable market for pineapple peel waste followed by banana peel waste and beetroot peel waste was realized.

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Analyzing Climate Change Effects: A Comparison of ARIMA, SARIMA and Distributed Lag Models on Air Quality Index Changes and CO2 Emissions

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Abstract

With an emphasis on domestic and industrial areas in India, this research examines how climate change is affecting Air Quality Indexs and carbon dioxide (CO2) emissions throughout the country. The study assesses the ability to forecast of SARIMA and Distributed Lag Model (DLM) time series models for global CO2 emissions per capita and average Air Quality Index anomalies in the Indian context, using more than 10 years of historical data. The findings show that distributed lag models and SARIMA models both produce accurate forecasts. However, reduced root mean squared errors (RMSE) show that distributed lag models function more accurately than Distributed Lag, ARIMA and SARIMA.

Researchers should use these results while developing mitigation plans and climate change legislation. Determining Air Quality Index anomalies and CO2 emissions per capita with accuracy can help us comprehend the processes of climate change.

Future study can use sophisticated GARCH models to increase predicting accuracy and look into other elements impacting climate change. This study adds to the literature by comparing the performance of time series models in forecasting climate-related variables, highlighting the importance of distributed lag models for accurate predictions, and emphasising the need for ongoing efforts to address and mitigate the impact of climate change.

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AI-Driven Smart Traffic Enforcement: Enhancing Road Safety with Real-Time CCTV Monitoring

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This paper presents a Smart Traffic Enforcement System integrating roadside CCTV, vision models, and AI to enhance road safety and law enforcement. Using CCTV footage, the system detects unsafe driving behaviors such as speeding and reckless maneuvers in real-time. It provides immediate feedback through smart traffic signs and a mobile app, aiming to correct risky driving habits. The system sends real-time alerts to law enforcement for severe violations, including vehicle details and movement predictions, facilitating quick intervention. By combining real-time monitoring with community input and automated reporting, this system enhances traffic safety and streamlines law enforcement efforts.

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Inclusive Virtual Support Groups for Academic Stress: A Psychoeducational Approach Among Young Adults

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This study investigates the effectiveness of inclusive virtual support groups using psychoeducation to reduce academic stress among young adults. With rising academic demands, many students face significant stress that affects both their mental well-being and academic performance. With the increasing reliance on technology, this research explores how digital platforms can be leveraged to provide scalable, sustainable mental health support in academic settings.

The program consists of six virtual sessions, incorporating activities grounded in Cognitive Behavioral Therapy (CBT) and emotional regulation techniques. Activities such as "Fear in a Hat," "Thought Replacement," and the "Feelings Walk" are designed to encourage emotional expression, empathy, and the development of practical coping strategies. Participants, selected based on high levels of academic stress, engage in group discussions and activities aimed at promoting self-awareness and positive thinking. Post-session qualitative interviews provide further insight into participants'experiences and coping mechanisms.

This research employs both qualitative and quantitative methods to assess the impact of psychoeducational group work on reducing academic stress and enhancing emotional well-being. The findings are expected to highlight the potential of virtual psychoeducational support groups as accessible, scalable tools for addressing stress in academic settings. These insights will inform educators, mental health practitioners, and policymakers on the benefits of integrating psychoeducation into student mental health programs.

Keywords: Academic Stress, Psychoeducation, Virtual Support Groups, Emotional Resilience, Young Adults

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Effects Of Rare Earth Metals On Total Proteins Estimation And Alkaline Phosphatase Activity In Drosophila

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The rare-earth elements (REE), also known as rare-earth metals, rare earths, or, in specific contexts, rare-earth oxides, and occasionally referred to as lanthanides (though scandium and yttrium, which are not part of this series, are commonly included), consist of 17 nearly identical lustrous, silvery-white, soft heavy metals. Lanthanum is a chemical element with the symbol La and atomic number 57. It is a soft, ductile, silvery-white metal that gradually tarnishes when exposed to air. Lanthanum does not have a known biological role in humans but is essential for certain bacteria. It is not highly toxic to humans but does exhibit some antimicrobial properties

Three different Crosses of test samples were subjected to biochemical test such as total protein estimation, performed by preparation of homogenate with buffer and TCA and centrifuged. Followed by addition of copper reagent and folin-phenol reagent, upon incubation under room temperature the colours intensity was read at 660nm using spectrophotometer. The test samples were compared with blank and BSA standards. Other estimation alkaline phosphatase activity was determined by treating the homogenate in sodium bicarbonate buffer with freshly prepared Diazo Blue reagent. The Colour intensity on incubation was read at 600nm and compared with control alongside Alpha - naphthol standards.

The statistical result through One way ANOVA indicated a significant reduction in protein and alkaline phosphatase level between groups of various doses with that of control in D. melanogaster

Since the Drosophilla share same genomic content with as that of humans this study discovers the underlying effect of Lanthanum involved in the toxicity and teratogenicity of REE in Drosophila.

KEYWORDS : Drosophila melanogaster, Lanthanum, Protien Estimation, Alkaline phosphatase activity, ANOVA, REE.

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Bioremediation of acrylonitrile using bacterial isolates from soil and water

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Nitriles are a widely used industrial commodity chemical, possibly a carcinogen and neurotoxicant. The extensive use of nitriles resulted in environmental contamination. Indeed, certain bacteria possess the capability to degrade nitriles. In the current research, we have reported the isolation, identification, and characterization of potent acrylonitrile-degrading bacteria isolated from soil and lake water. The bacterial isolates DSIS3 and DSIL2 demonstrated robust growth when exposed to acrylonitrile up to a concentration of 1.0% (V/V) and 0.7% (V/V), respectively. They showed Nitrile hydratase (Nhase) activity upon the addition of ε-caprolactam as an inducer. The isolate DSIS3 was identified as Pseudomonas aeruginosa, and DSIL2 was identified as Bacillus cereus through morphological, biochemical tests and 16S rRNA sequence analysis. The strains effectively degraded the acrylonitrile to acrylamide, subsequently converting it to acrylic acid while releasing ammonia in 24 to 48 hours. Pseudomonas aeruginosa DSIS3 hydrolyzed the other nitriles, with the order of degradation being acetonitrile > acrylonitrile > benzonitrile > valeronitrile. The adaptability of this bacterium in hydrolyzing various nitriles makes it a promising biocatalyst for organic synthesis or biotransformation and the bioremediation of toxic nitriles from the environment.

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Tiny Bubbles, Big Impact: EVs and the Future of Farming

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Extracellular vesicles are a potentially useful tool for sustainable agriculture, offering chances to improve soil health and crop productivity in environmentally friendly farming methods. The potential exists for these membrane-bound nanoparticles, which are released by diverse organisms, to facilitate the delivery of vital nutrients, foster advantageous interactions with the microbiome, and lessen the ecological consequences of traditional farming practices. (Aliku, 2019) Recent studies have demonstrated the ability of extracellular vesicles to stimulate plant growth, improve nutrient uptake, and induce resistance against biotic and abiotic stresses (Dey et al., 2004) (Phour et al., 2020). Furthermore, the biosynthesis of nanoparticles using microorganisms is a green and cost-effective technology that can be leveraged for diverse agricultural applications. (Singh & Singh, 2019) Sustainable solutions that meet the increasing need for food production while protecting the environment can be developed by incorporating extracellular vesicles and microbial nanotechnology into precision farming techniques. This review explores the current understanding of extracellular vesicles in the context of eco-friendly farming and discusses the potential of this innovative technology to contribute to a more sustainable agricultural future.

Keywords: Extracellular vesicles, sustainable agriculture, eco-friendly farming, crop productivity, soil health, microbial nanotechnology, precision farming

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EVs: The Tiny Solution to Our Massive Problem

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The predicted growth in plastic waste is anticipated to surpass efforts to mitigate its impact, rendering plastic pollution a global concern. There are significant negative consequences on the environment, animal welfare, and potentially human health associated with the extraction of raw materials, processing, and disposal of plastic waste. (Bidashimwa et al., 2023) Addressing this challenge necessitates innovative solutions. One promising approach is the utilization of extracellular vesicles, which are nanometer-scale particles released by cells, to recycle and manage plastic pollution. Extracellular vesicles have the capacity to break down plastic polymers through enzymatic activity, potentially enabling the upcycling and reuse of plastic materials. Furthermore, these vesicles could be engineered to target specific plastic types, enhancing the efficiency and specificity of the recycling process. (Zhu et al., 2022) Preliminary research has identified microbial strains capable of degrading various plastic polymers, including polyethylene and polystyrene, under mild conditions. Integrating this biological approach with established waste management strategies could lead to a more comprehensive and sustainable solution to the plastic pollution crisis.

Keywords: extracellular vesicles, plastic recycling, plastic pollution, biodegradation, upcycling, sustainability

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Blockchain and QR Code Integration for Counterfeit Detection to Enhance Product Authentication

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Counterfeit products pose significant risks to both consumers and legitimate manufacturers, necessitating effective identification and authentication methodologies. This research explores a novel methodology that leverages blockchain technology and QR codes for the detection and prevention of fake products. The proposed approach involves creating a smart contract on the Ethereum blockchain to store unique product identifiers, generating corresponding QR codes, and utilizing open-source tools like Open Refine and Elasticsearch for product information comparison. The process ensures that when a QR code is scanned, the product's authenticity is verified against the blockchain, providing a robust mechanism to detect counterfeit goods. This paper outlines the step-by-step methodology, including the generation of unique identifiers, QR code creation, smart contract deployment, and authenticity verification, along with the use of advanced tools for product comparison. The results demonstrate the effectiveness of this integrated system in mitigating the distribution of fake products, offering a reliable solution for ensuring product authenticity in various industries.

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Biostimulants and their role in plant growth

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Abstract:
Biostimulants are substances of natural origin, that are employed to plants targeting for plant growth, production and stress tolerance. We often replace non-sustainable fertilizers for growth and development of plant due to its inability to fix nitrogen and pesticides to control the diseases. The widespread use of fertilizers and pesticides in agriculture has raised concerns due to their harmful effects on the environment, human health, and ecosystems. Application of biostimulants in combinatorial way help to understand the synergestic or antagonistic effects on plant growth and aid in developing efficient stimulant avoiding the environmental pollution. Nanotechnology today offers several potential benefits for agriculture, including increasing agricultural production, inhibiting plant pathogens, and reducing the inadvertent release of chemicals into the environment. Hence developing nano based biostimulants is the promising strategy for environmentally friendly plant growth.

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To study the causal relationship between ghosting and loneliness

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Relationships are extremely difficult and since humans are social creatures we need to have fulfilling relationship for our well-being and mental health.
The aim of the study is to find the causal relationship between ghosting and loneliness
The current study looks at how ghosting can bring about loneliness in emerging adults from the age of 18 years to 29 years, A sample of 101 couples was taken. The data was collected from couples who were in a relationship for more than a year, the sample was chosen through snow ball technique and the two questionnaire was administered.
The GHOST scale, which evaluates experiences of ghosting, and the Perceived Loneliness Scale, which gauges emotions related to loneliness, Data was analysed by SPSS, Results show an existence of positive correlation of (r =.547, p <.001) between ghosting and perceived loneliness.
The current study has a larger implication about the effects of how technology how ever advantageous can bring in a lot of negativity and feelings of isolation and loneliness.

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Ready to steep Parmelia perlata based tea with enhanced antioxidant activity.

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This study focuses on the preparation and evaluation of antioxidant-rich stone flower tea, incorporating Parmelia perlata (stone flower), Kaempferia parviflora (black ginger), and Curcuma caesia (black turmeric). The decoction of P. perlata was prepared by extracting 100 g of the lichen with 100 ml of water at 80℃ for 60 minutes. The dried filtrate was combined with powdered K. parviflora, C. caesia, citric acid, and prebiotics (FOS). The antioxidant activity of the tea, assessed using the DPPH radical scavenging assay, demonstrated varying effects. P. perlata alone exhibited a low scavenging activity of 8.5 ± 1.23%, while K. parviflora and C. caesia showed 24 ± 1.6% and 19.8 ± 2.08%, respectively. The mixture of the three (5:5:2 w/w) significantly enhanced activity to 54.6 ± 1.97%. The final product, enriched with citric acid, achieved the highest DPPH scavenging activity of 61.5 ± 2.1%. The scavenging activity was also confirmed through thin-layer chromatography (TLC), showing improved clearance of DPPH in the final tea formulation, with a clearance zone of 1.3 cm compared to 0.3 cm for P. perlata alone. These findings indicate that combining Parmelia perlata with Kaempferia parviflora and Curcuma caesia significantly enhances the tea's antioxidant properties, making it a promising natural antioxidant source.

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Enhancement Of Seedling growth and Phytochemical Content in Spinach (Amaranthus Dubius) With Cold Plasma Treatment

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Red spinach, also known as "Amaranthus dubius"is a nutritious leafy vegetable that belongs to the amaranthaceae family. Red spinach is rich in essential nutrients like iron, calcium, vitamins A, C, and K, making it a healthy addition to one's diet. This study investigates the effect of cold plasma treatment, a non-thermal and eco-friendly technique on spinach seeds, focusing on germination rates, potential improvements in proteins, phytochemicals, chlorophyll a and chlorophyll b. We exposed the red spinach seeds to surface discharge- cold-plasma treatment for durations of 5,10 and 15 minutes and one set was treated as control set. After the seed incubation period of 14 days, germination rate was monitored and it was found to be around 37%,54%,61%,89% in control ,5 mins, 10 mins, 15 mins treated plants respectively. The results demonstrate a marked improvement in germination rates and early seedling growth compared to the control seeds. Phytochemical analysis and protein content was determined in the germinated seedlings. Flavonoids were found to be prominent in the 10 and 15 minutes treated plants than the control plants. The chlorophyll value was also found to be improved in the treated ones compared to the control plants. The time between exposure and application of the treated plants is of massive importance in the biochemistry of the plant as concluded from the results obtained from the current study and also suggests that cold plasma technology could be sustainable and effective method for improving spinach seed quality, leading to enhanced crop yield and nutritional value.

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Synthesis, Structural, Electrical properties and Electromagnetic Shielding Effectiveness Studies on PVA/PEG-PANI@WO3 Polymer-nanocomposite film

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Indeed, the growing interest in conducting polymers during this decade is largely due to their remarkable electrical properties, which open up a variety of exciting applications. These polymers can conduct electricity like metals while retaining the flexibility and lightweight nature of plastics. The versatility and tuneable properties of conducting polymers continue to drive research and development in these and other areas, expanding their potential applications and improving their performance in various technologies. The ever-increasing range for the electronic technology demands the requirement of materials capable of providing a large surface area at which the radiations can be controlled by absorption and reflection. In our present study we aimed to fabricate a PVA/PEG-PANI@WO3 Polymer-nanocomposite film by casting method. The prepared films were investigated by X-ray diffractometer (XRD), Scanning Electron Microscope (SEM), Energy Dispersive X-ray (EDX), Thermogravimetry Analysis (TGA), and Fourier Transform Infrared Spectroscopy (FT-IR). The surface morphology and elemental analysis confirmed the successful incorporation of WO3 into the PVA/PEG-PANI film. The thermal stability of the composite film is found good. The electrical properties of the films were measured in the frequency range of 20Hz to 1MHz at room temperature using an HP 4281A precision LCR meter. The PVA/PEG-PANI blend shows a conductivity of 5.553×10-5 S /m while it increased to 1.264×10-4 S/m with the addition of WO3 to the film. Based on the experimental observation the polymer nanocomposite film (PVA/PEG-PANI@WO3) exhibited boosted electrical properties. The higher electrical properties result in more reflection of electromagnetic waves contributing to higher Shielding Effectiveness.
Keywords: PVA, PEG, PANI, WO3, Polymer-nanocomposite, Electrical properties, EMI Shielding.

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Gesture based home automation using FPGA

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Gesture control and home automation have emerged as prominent areas of research, aiming to enhance the convenience and interactivity of smart homes. This project focuses on implementing gesture control for home automation on a Field-Programmable Gate Array (FPGA) using VHDL (Very High-Speed Integrated Circuit Hardware Description Language). By leveraging the capabilities of an FPGA, the project aims to develop a robust and real-time gesture recognition system that can interpret hand movements and trigger corresponding actions in a home automation setup. VHDL is employed to design and describe the hardware components required for gesture recognition, including image acquisition, preprocessing, feature extraction, and classification stages. The integration of gesture control with home automation offers a seamless and intuitive user experience, allowing homeowners to control various devices and systems through simple hand gestures, thereby increasing convenience, efficiency, and accessibility in smart home environments.

Keywords—hand gesture, FPGA

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Educational Ecosystems as Protected Areas of Biodiversity and Catalysts for Sustainable Development Goals

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The higher education systems around the world are primarily focused on achieving sustainable development goals, as such, our university has stood out as an example, due to the societal responsibility to nurture and train the minds of tomorrow's aspiring leaders and also, stimulate public awareness of sustainability in terms of sustainable land management practices. In this essence, a field surveys were conducted to document the tree flora in the university campus of India. Rare and endangered, yet native ethnomedicinal trees that have cultural and religious significance in ancient India (Bharat) were present on the campus. Overall, the findings will guide policy on urban land management practices of educational campuses in achieving valuable ecosystem.

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Plant-derived natural products for therapeutics and drug discovery: A phototherapeutic approach

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Plant-derived natural products have long been used in therapeutic practices and drug discovery, offering significant contributions to modern medicine. Exploring the potentials of these natural compounds through a phytotherapeutic approach and emphasizing their role in treating and preventing diseases is of global interest. Moreover, the increasing prevalence of life-threatening conditions and the financial barriers to conventional treatments, plant-based therapies present a viable alternative to various diseases. The enormous availability of bioactive molecules in various parts of the plant—leaves, bark, flowers, fruits, seeds, and roots—and their effective pharmacological properties makes their use as extracts, fractions, and molecules towards drug discovery. Hence, natural products from varying sources can engage with multiple targets of human disorders. This article summarizes different approaches for phytochemical and pharmacological screening for drug discovery and development with in-vitro, in-vivo and in-silico approaches. These findings would support the further exploration of the effective herbal source and their targeted action for various diseases providing key insights for potential therapeutics.
Keywords: Phytotherapy, phytochemicals, pharmacology, drug discovery, diseases.

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Nanotechnology for a Sustainable World: Innovative Approaches to Global Challenges

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The 17 sustainable development goals (SDGs) created by the UN call for urgent action by all member states to achieve ambitious goals like eradicating poverty and hunger, improving global health, reducing inequalities and spurring economic growth while battling climate change and conserving our oceans and forests by 2030. With merely 6 years left, the SDGs are far off track proving incremental and fragmented change insufficient. Linking multi-disciplinary scientific transformations to every goal is critical in translating the SDGs into action. Having already radicalized various industrial sectors from medicine to energy, the constantly evolving field of nanotechnology promises a diverse application in advancing sustainable development. This paper gives an overview of the advancements in nanotechnology that can provide unique solutions to pressing global issues. Researchers, policymakers and stakeholders can use these powerful nano-tools to create smarter cities, produce clean energy for all, conserve biodiversity, replace non-renewable resources and much more while overcoming roadblocks like high cost of production, accessibility and fair distribution to integrate nanotechnology in everyday life.
Keywords: Sustainable Developmental Goals, Nanotechnology, Global Challenges, Innovation, Conservation

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A Comprehensive Survey on Explainable AI in Healthcare: Challenges, Opportunities, and Future Directions

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The integration of Explainable Artificial Intelligence (XAI) into healthcare has emerged as a critical advancement, addressing the growing concerns over the "black-box" nature of AI systems. As AI technologies become increasingly prevalent in clinical settings, their complex decision-making processes often remain opaque, creating challenges for healthcare professionals who rely on these systems for accurate and reliable diagnoses and treatment recommendations. The lack of transparency can lead to distrust, limiting the adoption of AI in critical healthcare applications. This is particularly concerning in areas like diagnosis, treatment planning, and personalized medicine, where understanding the rationale behind AI-generated decisions is crucial for ensuring patient safety and informed consent.
XAI offers a solution by providing interpretable and transparent AI models, enabling healthcare professionals to understand and trust the decisions made by AI systems. This, in turn, enhances diagnostic accuracy, improves patient outcomes, and facilitates better communication between healthcare providers and patients. By making AI systems more transparent, XAI also helps in addressing ethical concerns, such as the need for informed consent and patient autonomy. Furthermore, XAI aligns with regulatory frameworks, such as the Health Insurance Portability and Accountability Act (HIPAA) and the General Data Protection Regulation (GDPR), which emphasize the importance of transparency, accountability, and data protection in AI-driven healthcare systems.
Despite its potential, the implementation of XAI in healthcare faces several challenges. These include the need for high-quality datasets, the complexity of developing models that balance interpretability with accuracy, and the necessity of interdisciplinary collaboration among clinicians, data scientists, and policymakers. Additionally, there is resistance to AI adoption within healthcare due to cultural and organizational barriers. Future research must focus on overcoming these challenges to fully realize the potential of XAI in transforming healthcare, making it not only more effective but also more ethical and trustworthy. By fostering a collaborative research environment, XAI can significantly enhance patient care and safety in the evolving landscape of AI-driven healthcare.

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Algae As Medicine

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The outburst of COVID-19 virus associated [SARS-COV-2] acute respiratory disease, emerged in December 2019, in Wuhan, China.
This virus threat on human lives has caused millions of deaths, worldwide.
The WHO has proclaimed the illness brought on by this virus to be a global pandemic.

The potential of Algae in combating the spread of COVID-19 is being investigated using algal compounds that has great antiviral properties.
Algae are a rich source of compounds such as lectins and sulphated polysaccharides, which have potent antiviral and immunity boosting properties.

Research is in process, to study the efficiency of algae-derived compound or metabolites as antibodies and vaccine raw material against COVID-19.

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Enhancement Of Chlorophyll Content and Phytochemical Content in Ragi (Eleusine coracana) With Exposure to Atmospheric Cold Plasma

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This study investigates the effects of cold plasma treatment on the phytochemical composition, chlorophyll content, and morphology of ragi (Eleusine coracana) seeds. Cold plasma, known for its potential in enhancing plant properties, was applied at varying exposure times to assess changes in these specific aspects.

The findings show that cold plasma treatment significantly enhances the phytochemical content of ragi seeds, indicating increased levels of beneficial compounds such as antioxidants. Chlorophyll content, measured by optical density (OD), was also found to be higher in treated seeds, suggesting improved photosynthetic efficiency and potential for greater biomass production.

Morphological observations revealed that cold plasma treatment positively impacts seedling development, leading to more vigorous growth and better overall plant structure.

In conclusion, cold plasma treatment presents a promising, eco-friendly approach to improving the phytochemical profile, chlorophyll content, and morphological traits of ragi seeds. This could contribute to enhanced plant growth and productivity. Future research should focus on optimizing treatment parameters and further exploring the long-term effects of cold plasma on plant health and development.

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Trancing through trauma: A hypnotherapeutic Approach to Healing Adverse Experiences and Trauma

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Hypnoanalysis or hypnotherapy is a shorter and targeted version of psychoanalytical hypnosis. It utilizes the unconscious and subconscious mind to alter the core beliefs, memories, and emotions inaccessible or aversive to the conscious mind. It helps in bringing out memories, events, emotions, and beliefs that are otherwise averted, repressed, or suppressed due to their disturbing or triggering nature. It is often used as a therapeutic modality for post-traumatic stress disorder, complex trauma, phobia, event-specific trauma, desensitization, psychosomatic pain management, grief processing, and so on. Hypnotherapy has been shown to be effective in treating trauma-related symptoms, including post-traumatic stress disorder (PTSD) (Bryant, et al., 2013) (Abramowitz, et al. 2017). Studies have found that hypnotherapy can reduce symptoms of PTSD, such as flashbacks and nightmares (Kirsch, et al., 2014)(Forbes, et al., 2018). Additionally, hypnotherapy is effective in treating trauma-related dissociation (Spiegel, et al., 2018). Hypnotherapy has also been used to enhance cognitive-behavioral therapy (CBT) for trauma (Lynn, et al., 2017). A study found that CBT combined with hypnotherapy was more effective than CBT alone in reducing PTSD symptoms (Schnurr, et al., 2017). Neuroimaging studies have found that hypnotherapy can alter brain activity in areas associated with trauma processing, such as the amygdala and prefrontal cortex (Lanius, et al., 2017) (Vermetten, et al., 2018). As effective as it is, empirical research data regarding its application and efficacy is lacking. This paper intends to fill that research gap by testing its efficiency in decreasing the impact of the traumatic event using hypnotherapy techniques of induction and silent abreaction. The paper plans to follow a quantitative approach through an intervention model to test the same. The participants shall be tested for hypnotic susceptibility using the Stanford Hypnotic Susceptibility Scale which is a 10-item scale that has a good internal consistency score with Cronbach's alpha ranging between 0.70 and 0.90 and reliability coefficients between 0.60 and 0.80. Upon scoring between 7

and 10 on this scale, they will be qualified for the intervention. The baseline readings will be collected using the 16-item Impact of Event Scale —which has scores ranging between 0.78 and 0.92 on Cronbach's alpha for internal consistency and good concurrent validity —followed by intervention. The intervention is a 45-minute hypnotherapy session by a trained professional who will administer induction followed by silent abreaction for the subsidence and minimization of adverse experiences or traumatic events, followed by positive suggestions and ending with progressive relaxation. Post-intervention, post-test data will be collected using the same Impact of Event Scale. The scores will then be summarized and analyzed using relevant statistical tools. The results will then be discussed further for application and perusal.

Keywords: Hypnotherapy, Trauma, Healing, Intervention, Experimental research, Abreaction, Induction, Hypnosis, Quantitative Research

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Impact of cold atmospheric pressure plasma Treatment on Luffa acutangula

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Ridge gourd plant, belonging to the spurge family Cucurbitaceae can grow in different geographical areas Growth of ridge gourd is favorable around 25℃ to 35℃ whereas temperatures lower than 20s ℃ or higher than 38℃ affects germination and yield. The main objective of the study was to investigate the effect of different time duration of cold plasma on the growth and yield of ridge gourd plant. In the current study, germination rate, morphological growth, phytochemical content, chlorophyll and protein content were assessed for both control and treated plants. Among the different time duration exposed plasma, the significant results were shown by 10 min duration compared with control. In the phytochemical analysis, flavonoids, alkaloids, reducing sugars were prominent in the 10 min treated plants compared with control in the second week of growth.

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Enhanced Photocatalytic Degradation of Methylene Blue Using LaTiO3 Nanoparticles

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A sol-gel (citric acid) technique was used to synthesize LaTiO3 at 3 different temperatures. The structural, morphological, and compositional analyses were implemented by making use of X-ray diffraction, scanning electron microscopy, energy-dispersive X-ray, transmission electron microscope, and ultraviolet-visible spectroscopy. The XRD studies aides the synthesize of the perovskite-type LaTiO3 nanoparticles formed and the nature of the crystallinity were shown to enhance with rise in annealing temperature. The morphology of the samples shows a grain-like particle with the proper

weight proportion of component elements. In addition , we have tested the samples photocatalytic activity by degrading a methylene blue dye solution. An improved photocatalytic activity was found at an elevated calcination temperature in particular samples.

Keywords : Sol-gel, Perovskite, LaTiO3, Photocatalytic, Dye degradation

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A Study On Chitinase Of Cytobacillus Firmus And Its Applied Potential

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This study observed four bacterial isolates from cockroach carcasses, labelled M1, M2, S1, and S2. Two isolates, M1 and S1, were chosen for further study based on their ability to produce hydrolysis zones on nutrient agar with milk and starch. Morphological analysis revealed that the isolates were Gram-negative rods, and further testing with colloidal chitin media (prepared from Agaricus bisporus) confirmed their ability to produce chitinase enzyme. M1 and S1 both demonstrated chitinase enzyme activity against cellulose, amylase, and chitin substrates, with M1 having the highest activity against cellulose (495 U/ml/min) and S1 against chitin (115 U/ml/min). Biochemical tests revealed that both isolates were non-motile, indole-negative, and gelatin-positive.
The isolates' antifungal activity was assessed using dual-assay plates, and significant inhibition of Penicillin (80.2%) and Aspergillus niger (86.7%) was observed. Furthermore, biocontrol activity tests revealed that crude enzyme extracts from both isolates had insecticidal and repellent effects on cockroaches and ants, resulting in irritation, cognitive disruption, and repulsion.
The isolates' identification by 16s rRNA sequencing confirmed that M1 and S1 were Cytobacillus firmus. This bacterium, formerly known as Bacillus firmus, is known for its ability to withstand harsh environmental conditions such as alkalophilicity, thermotolerance, heavy metal resistance, and salt tolerance.
These characteristics, combined with its ability to produce valuable enzymes, make Cytobacillus firmus important in industrial applications, bioremediation, biocontrol, and sustainable agriculture. Its potential applications include extreme environments such as space and deep ocean conditions, where it could play an important role in long-term exploration due to its resistance to stressors such as radiation, temperature extremes, and desiccation.
Key words: Chitinase, Cytobacillus firmus, Antifungal activity and 16s rRNA sequencing.

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Syncing with Nature's Rhythms: Biodesign and Biomimicry for Non-Human-Centered True Circularity

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The thesis explores the innovative integration of biodesign and biomimicry principles to address the challenge of decomposition through a non-human lens. Material circularity in terms of decomposition refers to the ability of a material to re-enter the natural cycle by breaking down into its constituent components in a way that is environmentally friendly and beneficial. In a circular economy, the goal is to minimize waste and maximize the reusability of materials. When a material can decompose effectively, it contributes to closing the loop of resource usage. With a focus on creating

sustainable solutions, the study proposes a novel framework that harmonizes natural processes with human design practices. The framework's design is articulated through a comprehensive website and an application, fostering accessibility and practical implementation. By taking inspiration from non-human organisms and their efficient decomposition strategies, the framework offers a holistic perspective that promotes responsible design solutions. Through a website and application, the thesis bridges the gap between theory and application, allowing practitioners to engage in eco-centric problem-solving and contribute to a more sustainable future.

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Using AI to analyse post-mortem Drug concentrations for estimating time of death

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Accurate estimation of time of death in forensic cases is essential to reconstruct the events leading to a person's death. Traditional methods rely heavily on circumstantial evidence and physiological parameters, which often lead to some uncertainty. This study explores the use of artificial intelligence (AI) to improve time of death estimation by analysing post-mortem drug concentrations. Machine learning algorithms, specifically time series models and neural networks, are used to correlate drug concentrations in biological samples with pharmacokinetic profiles. By leveraging large datasets containing known drug concentrations and corresponding times of death, AI models are trained to predict time of death with higher accuracy. The study integrates data from blood, urine, and other biological platforms to account for changes in drug metabolism and degradation. The proposed AI-based approach aims to refine forensic analyses by providing more accurate estimates of time of death, thereby helping investigators solve crimes more efficiently. Preliminary results demonstrate that AI models can outperform traditional methods in terms of accuracy and reliability, highlighting the potential of AI to revolutionize forensic toxicology practices. This study highlights the transformative impact of AI on forensic science, providing a promising tool for improving the accuracy of time of death estimates in post-mortem investigations.

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Nanoparticle-based strategies for the treatment of Tuberculosis

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Mycobacterium tuberculosis is the bacterium responsible for causing Tuberculosis (TB), a disease which has infected almost a quarter of the global population. Nearly 1.5 million people succumb to TB each year, thus making it as the most fatal infectious disease in the world. Earlier effective antibiotics against *Mycobacterium tuberculosis* are no longer efficient against strains of this pathogen that are extensive and multi-drug resistant. Various drug resistance categories of the TB causing bacterium emphasize on resistance and/or susceptibility to their conventional regimen. This review

explores the use of distinct forms nanoparticles including lipid-based NPs, Polymeric NPs, Metal-based NPs, carbon nanotubes, dendrimers, quantum dots, etc. in the treatment of tuberculosis, focusing on their mechanism of action. Several approaches used in the delivery methods of these NPs as drugs are discussed which incorporate encapsulation strategies and combination therapies. Furthermore, it also highlights some innovative NP-based strategies, including nano-vaccines and diagnostic tools, offering insights into their potential roles in the fight against TB.

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Design and Development of a Novel Industrial Automation System Using Arduino Microcontroller

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Industrial automation has become a cornerstone in advancing manufacturing and production systems globally. Industrial automation is significant because it transforms how industries operate, making them more efficient, flexible and competitive while improving safety and sustainability. It is a driving force behind modern manufacturing and production, enabling companies to innovate and adapt to the challenges of the 21st century. The major challenge in the industry is the availability of good and efficient industrial automation systems. The existing systems are not flexible because they are designed to perform specific tasks and are difficult to reconfigure the system for any changes. Another major challenge is that the conventional automation systems are more expensive. Hence there is a demand for cost effective and novel industrial automation systems across the world. Industrial automation system requires a controller which is flexible and feasible for its scalability. Arduino is one of the open source and cost effective platform to develop efficient control systems. This paper presents the design and development of a novel and cost effective industrial automation system using the Arduino microcontroller. The system is designed to control and monitor various industrial processes, providing an affordable and flexible solution for small to medium-sized enterprises. This paper is also helpful for the researchers in the field of industrial automation.
Keywords:
Actuators, Automation Systems, Industrial Automation, Microcontroller, Sensors.

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Photocatalytic activity of Vanadium Oxide nanoparticles synthesized using Citrus maxima fruit peel extract, against Malachite Green dye

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The present study was emphasized to investigate the photocatalytic degradation of malachite green dye (MG) using Vanadium Oxide nanoparticles (V2O5NPs) synthesized from Citrus maxima fruit peel extract. The biologically synthesized V2O5NPs were characterized by UV-visible spectroscopy, Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), and Transmission electron microscopy (TEM). The UV-visible spectrum of V2O5NPs showed a characteristic surface plasmon resonance (SPR) peak at 258 nm. The XRD analysis exhibited that the V2O5NPs were crystalline.

FTIR revealed that a capping agent stabilized the citrus maxima fruit peel extract with the nanoparticles. In addition, transmission electron microscopy results of V2O5NPs show monodisperse particles are linked together, creating a compact structure due to clustering, although some particles retain clear boundaries. V2O5NPs demonstrated exceptional degrading efficiency for MG, with about 74% elimination in 240 min of sunshine irradiation. As a result, this research concludes that citrus maxima fruit peel extract is a possible green resource for V2O5NP synthesis with potential dye degradation applications.
Keywords: Citrus maxima, Vanadium Oxide nanoparticles, Malachite green dye, Photocatalytic activity.

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Green Alternatives for Converting Agricultural Residues into Alkyl Levulinates: A Comparative Approach

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Biomass being renewable can provide a sustainable feedstock for energy and chemicals that are suitable for the needs of an automotive society. One of the promising biomass resources is agricultural waste. These residues contain a lot of cellulosic polysaccharides which is an important raw material for pyrolysis to produce intermediate chemicals. This proposed research work aim towards sustainable growth by employing greener and efficient synthetic approach to yield alkyl levulinate from furan derivatives, a vital bioplatform molecule of agricultural wastes such as corn husk, millet husk. Among many biomass derived-value added chemicals, alkyl levulinate is considered to be commercially important chemical as it is widely used as a solvent, flavor and fragrance material in chemical industry. The derived products of alkyl levulinate are characterized by using various spectroscopic techniques such as XRD, SEM, GC-MS, NMR, FT-IR, UV-Visible spectroscopy. It is also used as an additive with fuel that enhances the performance of engine. These alkyl levulinate substitutes various chemicals originated from fossil means and actually contribute indeed on the delivery chain of chemicals by attaining the goals of sustainability. This proposal aims at comparative study of production of alkyl levulinate from various agricultural wastes like corn husk, millet husk using greener methodology i.e using greener solvents during microwave assisted synthesis in presence of heterogeneous acid catalysts, as it provides better yield and follows simple downstream processing.

Key words: Agricultural wastes; Furan derivatives; Bioplatform molecule; Alkyl Levulinate; Microwave; Sustainability.

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Pectin/Kappa-carrageenan/ZnO Nanocomposite bio-film as Food packaging material

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In the current investigation an endeavor was undertaken to replace Synthetic polymer-based films employed in food packaging applications with films from renewable materials sourced from waste. A polymer Nano composite film was prepared from K-Carrageenan (KC), Pectin

and ZnO Nano particles (NPs) by solution casting method. The Morphology and structure of the P/KC/ZnO Nanocomposite films prepared were characterized by SEM, XRD, and FTIR techniques, the incorporation of ZnO NPs into P/KC films varied in mechanical, thermal, structural and barrier characteristics of Nano composite films. the result of the biodegradation investigation showed that both films could be degraded over a significant amount of time in ambient circumstances, making them a better option for ecofriendly food packaging material

Keywords: Pectin-ZnO/KC, Eco-friendly, Biodegradation, Food packaging

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Navigating Mental Health: The Role of Self-Efficacy in Enhancing Teletherapy Engagement and Outcomes

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Self-efficacy, or the belief in one's ability to perform tasks and achieve goals, significantly affects experiences with teletherapy. Teletherapy involves delivering mental health services through technology such as video calls, messaging platforms, or mobile apps. Individuals with high self-efficacy are more likely to engage with teletherapy effectively, navigate technology with confidence, and participate actively in sessions, leading to improved mental health outcomes. Conversely, those with low self-efficacy may face challenges with technology, reduced engagement, and less persistence in therapy. Addressing self-efficacy is crucial for enhancing teletherapy's effectiveness and ensuring individuals feel competent in managing both the technological and therapeutic aspects of the process.

Objective

This study aims to explore how self-efficacy impacts engagement, technological adaptability, and therapeutic outcomes in teletherapy. It focuses on understanding how varying levels of self-efficacy influence individuals' experiences with teletherapy, especially in addressing the demand-supply gap in mental health services.

Significance

By examining the relationship between self-efficacy and teletherapy outcomes, the study seeks to identify ways to improve engagement and effectiveness. Understanding these dynamics will provide insights into designing better support strategies for individuals with low self-efficacy, thereby enhancing the overall impact of digital mental health interventions and addressing gaps in service provision.

Utilizing an exploratory mixed-method research design, the studu will assess the effectiveness of the Teletherapy in people with low self esteem. Additionally, this research will explore the sustainability of teletherapy as a long-term solution in mental health care.

Keywords: Self-Efficacy, Teletherapy, Engagement, Technological Adaptability, Therapeutic Outcomes, Sustainability

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Design and Development of Bluetooth Controlled Smart Home Automation System Using Arduino Microcontroller

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The increasing demand for home automation systems has led to the development of various technologies aimed at making life easier and more efficient. This paper presents the design and development of a Bluetooth-controlled smart home automation system using an Arduino microcontroller. The system enables users to control household appliances through a Bluetooth-enabled smartphone application, eliminating the need for complex network setups or internet connectivity. The proposed system is cost-effective, user-friendly, and scalable, allowing for automation of devices such as lights, fans, and security systems. Additionally, the system is designed with flexibility to add more appliances as per user requirements.

Keywords
Smart home, Bluetooth, Home automation, Arduino microcontroller, Wireless control, HC-05, Android platform.

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Quantum Computing in Biological Sciences: Revolutionizing Research and Applications

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Quantum computing is a cutting-edge technology that integrates the principles of quantum mechanics to perform complex computations far beyond the capabilities of classical computers. By utilizing quantum bits, or qubits, quantum computers can process vast amounts of data simultaneously, making them especially powerful for solving problems involving large datasets and intricate calculations. This paper explores the integration of quantum computing with biological sciences, highlighting its potential to revolutionize biological research. Furthermore, it examines various quantum algorithms used for processing biological data and the development of quantum hardware tailored for biological applications. Through an in-depth analysis of existing literature, the review addresses the challenges, platforms, and difficulties faced when applying quantum technologies to biological studies. Key areas include molecular structure prediction, personalized medicine, machine learning, and biological simulations—fields where quantum computing's ability to handle complex computations offers significant benefits. While still in its early stages, quantum computing faces challenges like error-prone algorithms and hardware instability. Despite these hurdles, its advantages—faster, more efficient, and accurate data processing—make it a valuable tool for advancing biological research. In conclusion, the integration of quantum computing with biology holds immense potential, promising new avenues of discovery despite the challenges that remain.

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Sustainable Fabrication of CeO_2/rGO Nanocomposites Using Reflux Methodology: Comprehensive Characterization and Structural Analysis

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In this study, we present a sustainable approach to fabricating cerium oxide/reduced graphene oxide (CeO_2/rGO) nanocomposites using a green and efficient reflux methodology. This eco-friendly synthesis method leverages mild conditions and minimizes the use of hazardous chemicals, aligning with principles of green chemistry. The process involves the reduction of graphene oxide and simultaneous incorporation of cerium oxide nanoparticles through a reflux reaction, leading to the formation of CeO_2/rGO composites.

The synthesized CeO_2/rGO nanocomposites were subjected to a comprehensive set of characterization techniques to elucidate their structural, morphological, and chemical properties. X-ray diffraction (XRD) and Raman spectroscopy confirmed the successful formation of CeO_2 nanoparticles and the reduction of graphene oxide, revealing the preservation of the graphene structure. Scanning electron microscopy (SEM) and transmission electron microscopy (TEM) provided insights into the morphology and distribution of CeO_2 nanoparticles on the rGO sheets, illustrating a well-dispersed and uniform composite.

Fourier-transform infrared spectroscopy (FTIR) analysis indicated the presence of key functional groups and interactions between CeO_2 and rGO, while Brunauer-Emmett-Teller (BET) surface area measurements highlighted the high surface area and porosity of the nanocomposites. These findings underscore the effectiveness of the reflux method in producing high-quality CeO_2/rGO composites with potential applications in various fields.

Overall, the sustainable fabrication approach not only ensures environmentally friendly production but also provides CeO_2/rGO nanocomposites with enhanced structural and functional properties. The detailed characterization paves the way for further exploration of these materials in catalytic and environmental applications, particularly in the realm of photocatalysis and pollutant degradation.

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X-Material Sandwiched Between Absorber/Gold Contact for Nanowall-Based Solar Cell

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Nanostructure technique is most significant in photovoltaics for providing advanced sustainable energy solution. The unique three-dimensional (3D) nanowall architecture offers better surface area-to-volume ratio, improving light absorption and charge carrier collection compared to traditional flat-plate designs. Besides these advantages, maximizing performance in the longer wavelength range remains a challenge. To address this, the paper under consideration evaluates the performance improvement of CdS/CdTe nanowall-based solar cells, focusing on their efficiency in the longer wavelength range by incorporating various materials, including Lead Telluride (PbTe), Lead Sulfide (PbS), Germanium Telluride (GeTe), Molybdenum Ditelluride ($MoTe_2$), Copper Telluride (Cu_2Te), and Tin Telluride (SnTe), at the CdTe/gold interface. TCAD software Silvaco have been employed to analyse the impact on electrical performance of the device. A detailed analysis reveals that $MoTe_2$ provides the best balance between internal quantum efficiency (IQE) and essential photovoltaic parameters. This study also reveals that integrating these materials can significantly affect the electronic band alignments and charge carrier transport, optimizing the band offsets and enhancing the power utilization in the longer wavelength range. The findings offer valuable insights into material selection for improving overall efficiency, guiding future developments in semiconductor devices and renewable energy technologies.

Keywords: Photovoltaics; TCAD Silvaco; CdS/CdTe Solar Cells; Molybdenum Ditelluride; Nanowall Solar Cells

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Synthesis and characterization of Polyaniline conducting polymer as binder for electrochemical applications

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Polyaniline (PANI) is an attractive conducting polymer due to its unique electrical properties, environmental stability, and possible applications in sensors, batteries, antistatic coatings, etc. It can be conductive or insulating by tuning the synthesis conditions, which would give rise to a broad application of this material. Here we have synthesized PANI using the chemical oxidative polymerization method by varying the concentrations of ammonium persulfate (APS) reagent from 0.4 M to 0.55 M oxidant to observe various effects on the conductivity. The synthesized PANI samples have been subjected to study the structural, morphological, optical and thermal properties. The properties have been changed with respect to the change in APS concentration. After understanding the change in properties due to the APS concentration, we will measure the conductivity and depending on the conductivity, we will use it as a binder for electrodes in electrochemical studies like Hydrogen evolution, super capacitor applications.
Key words: Polyaniline; structure; morphology; chemical oxidative polymerization

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The Role of AI and IoT in Enhancing Food Security and Sustainable Agriculture

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The integration of the Internet of Things (IoT) in agriculture is playing a vital role in enhancing food security and promoting sustainable farming practices. IoT devices, such as sensors, drones, and automated machinery, enable real-time monitoring of soil conditions, weather patterns, and crop health. These technologies facilitate precision agriculture by optimizing the use of resources like water, fertilizers, and pesticides, leading to improved productivity and reduced environmental impact. By minimizing resource wastage and promoting efficient land use, IoT supports sustainable agricultural practices and helps address challenges such as climate change and pest control. Additionally, IoT-generated data offers valuable insights to farmers, policy-makers, and stakeholders, enabling informed decision-making to secure a stable and resilient food supply chain. As the global population continues to rise, IoT technologies will be essential in ensuring food security and supporting sustainable farming practices, driving the agricultural sector toward a more resilient and sustainable future.

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A study on Nerium oleander extract as a potential mosquito larvicide.

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Mosquitoes transmit serious diseases like malaria, dengue, chikungunya, and yellow fever. Plant extracts, including Nerium oleander leaf and flower extracts, offer a promising alternative to chemical insecticides. This study assessed their larvicidal effects on Culex mosquitoes. Flowers and leaves were collected, shade-dried, powdered, and then extracted using methanol, ethanol, hexane, and water. Vials with 5 ml of water and 1 ml of extracts were tested with fourth-instar larvae. The study found that polar solvents (ethanol and methanol) and hexane were more effective than aqueous extracts, with hexane showing the quickest action. Nerium oleander extracts demonstrate potential as eco-friendly larvicides, useful for controlling mosquito larvae, managing stored grain pests, and addressing other harmful larvae.

Keywords: Insecticide, eco-friemdly, Nerium oleander, Culex mosquito, fourth-instar larvae, Flower and Leaf extract.

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A study on the hemolytic activity of aqueous extract of Nerium oleander

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The hemolytic activity of the aqueous extract of Nerium oleander was investigated to evaluate its potential cytotoxic effects on erythrocytes. Nerium oleander, a widely distributed ornamental plant known for its toxicological properties, contains cardiac glycosides that may pose significant health risks. Aqueous extracts were prepared and tested for hemolysis at various concentrations. Aqueous leaf extract and aqueous flower extract was prepared using the leaves and flowers of Nerium oleander respectively. Blood sample was collected from Sankalp Nethralaya and polyclinic at HSR Layout. Two methods, slide method and tube method, were used to assess the hemolytic activity of leaf and flower extracts of Nerium oleander. More number of echinocytes were observed in the slide of leaf extract whereas no significant changes were observed in the slide of flower extract. In tube method, the tube with leaf extract was clear and the tube with flower extract was turbid. Hence leaf extract has significant effect on RBC Lysis.

Keywords: hemolysis, Nerium leaf extract, Nerium flower extract, echinocytes

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Interplay of GLP-1 and IL-6: Implications for Pancreatic and Brain Health

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At Present, diabetes has no recognized treatment. The treatment of type 2 diabetic mellitus (T2DM) comprises a variety of pharmacological interventions have been licensed; some are undergoing clinical trials, and they are categorised based on how they work. insulin types, sodium-glucose cotransporter type 2 inhibitors, biguanides, thiazolidinediones, alpha-glucosidase inhibitors, meglitinides, sulfonylureas, and incretin-dependent treatments (dipeptidyl peptidase 4 inhibitors, or DPP-4, and glucagon-like peptide-1 receptor agonists, or GLP-1R). While some of the medications currently on the market are useful in the treatment of type 2 diabetes, long-term pharmacological side effects continue to pose a significant problem. Currently, GLP-1R agonists are the prescribed drugs to take in addition to oral metformin when treating type 2 diabetes is not possible. GLP-1 binds specifically to the glucagon-like peptide-1 receptor (GLP-1R) in the body, directly stimulating pancreatic β-cells to secrete insulin, boosting cell differentiation and proliferation, and preventing cell death to lower blood sugar levels. In both human and murine models, the glycaemic controlling impact of GLP-1 and its analogues has been thoroughly investigated in relation to numerous illnesses. According to recent research, GLP-1 can influence the innate immune response in a variety of inflammatory conditions. Hyperglycemic conditions can lead to DNA breaks, Fas up-regulation, and destruction of pancreatic β cells. Elevated levels of ROS, hypoxia, and TNF-α trigger IKKβ and JNK1 signaling pathways, inhibiting insulin receptor substrate and weakening insulin signal transduction. These pathways act as mediators between stress and the inflammatory response, demonstrating the interplay between inflammatory and metabolic signaling pathways. This review provides an overview of the research progress of GLP-1 and its analogs in immunomodulation and their related signal pathways.

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Probiotics and their health benefits

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Probiotics are well known for their effective health benefits to their host and have gained significant attention for their role in maintaining gut health and overall well-being. Among the various groups of probiotics, lactic acid bacteria (LAB) are particularly noteworthy for their prevalence in fermented foods and their ability to produce lactic acid through carbohydrate fermentation. This metabolic pathway of LAB not only enhances food preservation but also contributes to the competitive inhibition of pathogenic bacteria in the gut. A comprehensive understanding of LAB involves the application of various biochemical tests to characterize their metabolic capabilities and identify various species and specific strains. Screening and identification of LAB includes Gram' s reaction, catalase activity, carbohydrate fermentation, homo-and hetero-lactic acid fermentation, tolerance to temperature and pH, osmotic stress tolerance, bile salt hydrolase activity, citrate utilization, nitrate reduction activity etc., and molecular identification. The LAB will be assessed for their probiotic attributes such as tolerance to acid and bile salts, sensitivity to antibiotics, antimicrobial activity, resistance to phenol, cell surface hydrophobicity and in vitro adhesion to epithelial cells, auto-aggregation capabilities, and survival abilities in simulated gastric juice. Further safety evaluation of the LAB isolates includes, DNase activity, hemolysis activity, antioxidant assays, and cytotoxicity assays. Probiotics from fermented food products offer a holistic approach to promoting health through nutrition enhancement, dietary microbiome diversity, natural preservation, and cultural sustainability and significance. These insights support on the selection of effective probiotic strains for therapeutic applications and opens avenues for the development of novel functional foods aimed at promoting gut health.

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Spirulina Sustenance: The Algal Alternative For Meal Replacement Bars

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Spirulina meal replacement bars offer a convenient, nutrient-dense alternative to traditional meals, with the potential to address specific dietary needs and improve global health outcomes. A 2011 study on Spirulina platensis highlighted its rich nutrient profile, including antioxidants that protect cells, reduce inflammation, and support heart health by lowering cholesterol. Spirulina also shows potential in alleviating allergy symptoms like hay fever and enhancing physical performance, making it popular among athletes.

Our current research into Spirulina-based meal replacement bars aims to explore their effectiveness in addressing dietary deficiencies across diverse populations. This study anticipates several key outcomes: first, it aims to showcase the superior nutritional benefits of Spirulina bars compared to traditional meals. Second, it will address challenges related to production, distribution, and consumer acceptance, leading to strategies for overcoming these barriers. Finally, the research will assess the broader impact of Spirulina products on global food security, particularly in mitigating malnutrition and promoting sustainable nutrition practices.

Spirulina's sustainability, combined with its potential to improve health and nutrition, positions it as a valuable tool in addressing malnutrition and supporting global food security initiatives, making it a promising addition to the future of food.

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Study On Some Rare-Earth Doped Halides For Optical Applications

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In this research work, we prepared SmI2 anhydrous hydrate rare-earth iodides by using an eco-friendly Annealing technique using He or H2 furnance for vaccum dehydration. To develop and apply these scintillators effectively, it is crucial to have an efficient and economical method to produce high-purity Samarium di-iodide (SmI2). We conducted a comparative study on the dehydration mechanisms of SmI2 hydrate and its mixture with HI using I-V and fluorescence spectroscopy. The photoluminescence excitation spectrum of Samarium di-iodide at 374nm is recorded and studied, because of their, luminescent features, most intensive peaks, and high color purity.The thermal decomposition process of individual Samarium di-iodide hydrate was found to be as SmI2, and we comprehensively studied the solution combustion mechanism. Samarium di-iodide is a strong electron reducing agent. The importance of SmI2 will be discussed.

Keywords: Samarium di-iodide , Rare-earth.

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Influence of cerium on the structural and electrical properties of some novel ferrite

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In this work we report structural and electrical properties of Co1-xCdxCeyFe2−yO4 (0.0 ≤ x≤1.0; y=0.0, 0.1) nanoferrites have been synthesized successfully by novel solution combustion method. Structural investigation was studied using x-ray diffraction (XRD), Fourier infrared spectroscopy (FTIR), Scanning electron microscopy (SEM) and Elemental analysis by x-ray diffraction (EDAX) techniques. The DC electrical conductivity was measured by the two probe method. XRD patterns revealed the formation of cubic spinel structure. The lattice paramreter is found to increase with Cd2+ ion content due to ionic radius difference. FTIR spectra exhibit two strong absorption bands in wave number range 550 cm-1 and 450 cm-1. Scanning electron micrographs of the nanoferrites showed agglomerate and spherical in shape. Moreover, the Curie temperature decreases and impedes the conduction with Cd2+ ions Ce3+ ion and substitution.

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Structural, dielectric and electrical properties of nanocrystalline Mg1-xZnxPryFe2-yO4

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The present work reports the structural, dielectric and electrical properties of nanocrystalline Mg1-xZnxPryFe2-yO4 (0.0 ≤ x ≤ 1.0; y = 0.0, 0.1) ferrites synthesized by novel solution combustion method. All the synthesized samples were characterized by X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electric microscopy (SEM) and Energy dispersive x-ray analysis (EDAX). Dielectric parameters and complex impedance measurements were carried out as a function of frequency and composition at 300K. XRD patterns of synthesized samples revealed the formation of single-phase cubic spinel structure. It was observed the lattice parameter increased with increase in Pr+3 content. Moreover, the average crystallite sizes were found in the range 23-28 nm. X-ray density was found in the range 4.567- 5.201x103 kg/m3. Morphological observation showed the presence of agglomeration, spherical and polygon irregular shaped particles. Chemical compositions of the sample were identified based on EDAX spectra. The values of dielectric parameters and imaginary parts of impedance have been decreased while ac conductivity increased with increase in frequency. The dielectric dispersion in the samples has been understood by Koop's theory and Maxwell–Wagner type of interfacial polarization. Moreover, the dielectric parameters and ac conductivity have been increased and attain a maximum value beyond which they decreased with increase Zn2+ ion concentration. Finally, the lattice parameter increases while dielectric parameters were significantly reduced with Pr3+ ion substitution.

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Gesture control and home automation

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Gesture control and home automation have emerged as prominent areas of research, aiming to enhance the convenience and interactivity of smart homes. This project focuses on implementing gesture control for home automation on a Field-Programmable Gate Array (FPGA) using VHDL (Very High-Speed Integrated Circuit Hardware Description Language). By leveraging the capabilities of

an FPGA, the project aims to develop a robust and real-time gesture recognition system that can interpret hand movements and trigger corresponding actions in a home automation setup. VHDL is employed to design and describe the hardware components required for gesture recognition, including image acquisition, preprocessing, feature extraction, and classification stages. The integration of gesture control with home automation offers a seamless and intuitive user experience, allowing homeowners to control various devices and systems through simple hand gestures, thereby increasing convenience, efficiency, and accessibility in smart home environments.

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Study on endophytic bacteria and fungi isolated from leaves of Stevia rebaudiana

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In the present study, endophytic bacteria and fungi were isolated from leaves of Stevia rebaudiana from Karnataka and Kerala regions. Endophytes were screened for diversity and their ability to produce stevial metabolites. A total of 20 fungal and 17 bacterial isolates were isolated from leaves. The diversity analysis revealed that the plant harbored diverse bacterial and fungal groups and the dominant microbe varied according to the sampling regions. The isolates were assigned to 7 fungal and 6 bacterial species based on morphology. Out of 13 representative isolates tested for stevial metabolite production, 9 isolates confirmed the ability to produce Stevioside and rebaudioside through TLC analysis.

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Klebsiella's Arsenal: Unveiling the Molecular Weapons of a Formidable Foe

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Klebsiella pneumoniae (kp)is an opportunistic pathogen and causes wide range of infections from mild to life threatening diseases: pneumonias, urinary tract infections, bacteraemia, and liver abscesses. Classically, KP has only seriously infected immunocompromised people, the discovery and spread of hypervirulent strains has increased the number of vulnerable individuals to include immunocompetent and healthy individuals. The pathogenesis of KP in the urinary tract has been the subject of increased study attention throughout the past ten years. These studies have started to identify the bacterial growth and biofilm production components. Furthermore, the number of virulence factors, including but probably not limited to adhesion factors, capsule synthesis, lipopolysaccharide present, and siderophore activity, mediate KP infectivity. The molecular pathophysiology of KP will be better clarified with the establishment of both in vitro and in vivo infection models. Similar

to the majority of opportunistic infections, the course of an infection is mostly determined by the characteristics of the bacteria and the host. Moreover, Since the majority of clinical isolates show resistance to multiple antibiotics, which can result in treatment failure and the likelihood of systemic spread, infections are particularly challenging to treat. Because of the rising antibiotic resistance, KP is becoming a more serious hazard to public health and one of the most virulent organisms causing infections that can be fatal. The present review provides an overview on the various factors that contribute to its pathogenesis and persistence.
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Impact of Pr 3+ on structural, electrical and magnetic properties of Mg-Zn nanoferrites

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In the present research work, we have prepared Mg 1−x Zn x Pr y Fe 2−y O 4 (0.0 ≤ x ≤ 1.0 in steps of 0.2; y = 0.0 0.1) nanoferrites by novel solution combustion technique using pure Magnesium nitrate [Mg(NO 3) 2 ·6H 2 O], Zinc nitrate [Zn(NO 3) 2 ·6H 2 O], Ferric nitrate [Fe
(NO 3) 3 ·9H 2 O], Praseodymium nitrate [Pr(NO 3) 3 ·6H 2 O] are used as oxidizers and urea [CO(NH 2) 2] as reducing agents (fuel). The respective metal nitrates and urea weighed accurately in stoichiometric ratio. A clear solution is obtained by dissolving metal nitrates and urea in deionized water. The aqueous solution containing precursor solutions (redox mixture) is taken in a Pyrex dish was placed in a muffle furnace and heated up to 500 0 C in air atmosphere. Initially, the solution begins to boil in muffle furnace then froths, ignites and liberate large amount of heat and gases (N 2 O and CO 2), vaporizes the entire solution instantly to yield fluffy voluminous nanoferrites fine powders. From the XRD studies, the lattice parameter enhanced from 0.82344nm to 0.84420nm owing to replacement of smaller ionic radius Mg 2+ ions (r Mg 2+ = 0.066 nm) by larger ionic radius Zn 2+ ions (r zn 2+ = 0.084 nm). Further, on replacement of smaller ionic size ferric ions or Fe 3+ ions (r Fe 3+ = 0.067 nm) by larger ionic size Pr 3+ ions (r Pr 3+ = 0.113 nm), the lattice parameter decreased from 0.81924 nm - 0.83645 nm due to shrinking of the unit cell. The average crystallite sizes were in the range of 44.24- 22.144nm. It is observed that theoretical X-ray density enhanced from 4.567 to 5.625 gcm -3 with substitution of Zn 2+ ions and from 4.356 to 5.201 gcm -3 with Pr 3+ ions. This is due to fact that atomic weight of Zn 2+ ion (M Zn = 65.00 a.m.u) is greater than Mg 2+ ion (M Mg = 24.305 a.m.u) and atomic weight of Pr 3+ ions (M Pr = 140.90765 a.m.u) has greater than that of Fe 3+ ion (M Fe = 55.85 a.m.u). in FTIR spectra, the higher frequency absorption band υ 1 , lies in wavenumber range 526-518 cm -1 assigned due to stretched vibrations of metal ion-oxygen complexes (tetrahedral complexes) at A-sites, M tetra ↔O or Zn 2+ ↔O; The lower frequency
band υ 2 , formed in the wavenumber range 440-434cm -1 due to intrinsic stretching vibrations of metal ion-oxygen complexes (octahedral complexes or) at B-sites (M octa ↔O). It is clear that, with increase in Zn 2+ ions content, the position of ν 1, shifting towards lesser
wavenumbers side or higher frequency side, 585 - 553 cm -1 , due to molecular weight of Zn 2+ ions (M Zn = 65.0 a.m.u) is greater than Mg 2+ ions (M Mg = 24.305 amu and Fe 3+ ions (M Fe = 55.845 a.m.u). Furthermore, the wavenumber of lower absorption band, υ 2 , shifting frequency side, from 440–434 cm -1 due to transfer of Fe 3+ ions from A-sites to B-sites. SEM micrographs explore that grains are almost spherical with an average size of 82.86 nm-183.5nm]. From DC electrical conductivity, it is observed that the variation of log σ DC with temperature [T] is a straight line graph with breaks or kinks due to Curie temperature (T C) for nanoferrites with compositions up to x ≤ 0.60 and y = 0.0 and 0.10. These breaks suggest that there is change
in conduction mechanism and materials transforming from ordered ferrimagnetic state to disordered paramagnetic state. The compositional dependence of DC found to increase up to composition x = 0.2; y = 0.0 and x = 0.4; y = 0.1, attains maximum and thereby decrease with increasing Zn 2+ ion concentration. The room temperature magnetic properties that the loops are very narrow and revealed the soft nature magnetic material behaviour. Further, the saturation magnetization (Ms) and the remnant magnetization (Mr) attain the maximum value and thereby decreased with increasing Zn 2+ and Pr 3+ content.

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Efficacy of Heterorhabditis indica, Mass multiplied on Bombyx mori. L as potential biocontrol agent against Holotrichia consanguinea.

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In India, Holotrichia consanguinea is a serious pest that targets peanuts andsugarcane as well as other economic crops. Under both lab and field settings, the effectiveness of entomopathogenic nematodes (EPN), namely Heterorhabditis indica (mass multiplied on Bombyx mori. L as a host), against H. consanguinea (Sugarcane root Grub) was evaluated. In filter paper and soil column assay, the susceptibility of insect pest varied significantly when exposed at different nematode concentrations. In a lab experiment, H. indica showed considerably increased mortality rates in second-instar root grub larvae, causing 40.5–100% mortality and 32.5–69.5% mortality against fourth instar root grub. These findings showed that grubs in their second instar were more vulnerable than those in their fourth instar with different nematode concentration. Infective juveniles (IJ) of nematode species and a commonly used insecticide, phorate were tested against sugarcane root grub in the field conditions. According to field trail data, applying H. indica at a dose of 2.5 × 109 IJ ha−1 resulted in a substantially larger percentage reduction in H. consanguinea grub population than applying phorate but phorate application was more effective in lowering the fourth instar grub population than nematode species in the field trails. These studies collectively imply that H. indica might be a viable biocontrol agent for H. consanguinea, for sustainable agricultural practice.

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The miRNA-Mpox Connection: Elucidating the Role of MicroRNAs in Virus-Host Interactions

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Within the genus Orthopoxvirus, monkeypox virus (MPV) is a viral zoonotic disease that is spread from animal to human. It has been demonstrated recently that the MPV outbreak has spread to more than 80 nations. The pathogen and host engage in intricate interactions that dictate the final outcome of microbial infection. Recognition of conserved signature: molecular structures, known as pathogen-associated molecular patterns (PAMPs) typically starts host–pathogen interactions. Pathogen Recognition Receptors (PRRs) that are germline-encoded host sensors are responsible for sensing PAMPs. These molecular interactions are essential for the activation of both adaptive and innate immune system. Recently, microRNAs (miRNAs) have been shown to play a role in controlling innate immune pathways. Small noncoding RNAs (miRNAs) with about 19-23 nucleotides have emerged as translational repressors of gene transcripts. They attach to the 3′-untranslated regions (3′-UTRs) of target transcripts, causing the transcripts to be degraded or the translation of proteins to be inhibited. The relationship between miRNAs and PRRs signalling has been demonstrated by mounting data on miRNA functions. Numerous miRNAs have been shown to express differently when the MPV virus is present, which may be used to understand the molecular mechanism responsible for mpox pathogenesis. Studies have revealed that Mpox illnesses exhibited dramatically altered miRNA expression profiles. Among them, Mpox patients had dysregulated expression of miR-19b-3p. Bioinformatics tool was to investigate the molecular role of miR-19b-3p in the aetiology of Mpox pathogenesis.

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Milleffle

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Milleffle is a nutritionally superior waffle crafted from unique blend of millets such as Ragi, Bajra and buckwheat. It stands out as a gluten-free option. It is known that juvenile diabetes is a chronic disease among children .The management of this autoimmune disease is more important, as it causes extreme hunger in children. The incorporation of millets in our diet becomes more important to manage the disease .As it is a logical pragmatic strategy to provide nutrient dense fibre rich foods to children who are vulnerable to diabetes . For this waffle will be attractive to the children as they can consume more of it to replace the starch based, fried, readily available junk food to overcome the nutrient deficiencies. Waffle prepared using millet powder like pearl millet, barnyard millet, finger millet and little millet is good as it is rich in iron, calcium, phosphorus and fibre. The recipes were first standardised, tested for their acceptability using standard procedures and has to be popularised among juvenile diabetes.

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Advancing Traditional Medicine: Modern Techniques in Herbal Drug Discovery and Authentication

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Advancing Traditional Medicine: Modern Techniques in Herbal Drug Discovery and Authentication Since ancient times, herbal medicines have been integral to traditional systems like Unani and Ayurveda. Today, rising demand for these remedies stems from population growth, drug shortages, treatment costs, and side effects of allopathic drugs. However, the resurgence of Ayurvedic industries faces challenges such as raw material scarcity, adulteration, and toxicity. This presentation explores innovative solutions to these issues. We discuss the application of DNA barcoding for accurate plant identification and authentication. DNA barcoding utilizes short genetic markers to identify species, providing a reliable method to distinguish between closely related plants and detect adulterants. This technique, combined with bioinformatic analysis, offers a powerful tool for quality control in the herbal medicine industry. Additionally, we examine how plant tissue culture techniques address raw material shortages and quality concerns. By highlighting an Ayurvedic industry case study, we illustrate current practices, ongoing research, and future prospects in overcoming obstacles in herbal medicine production. This presentation aims to demonstrate how modern scientific techniques can support and enhance traditional medicinal systems to meet growing global healthcare demands.

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Regulatory Challenges and Ethical Dilemmas in Surrogacy

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A critical analysis on the reproductive health concerning "Debates on Surrogacy Regulation Act, 2021"

Objective: To critically analyze and study the concerns regarding reproductive health in respect to debates on surrogacy and role of modern protests in nonviolent resistance.

Specific Objectives:
1] To comparatively analyze the opinions on the debates of surrogacy.
2] To provide an overview on the effectiveness of India's ban on commercial surrogacy.
3] To understand and study the purpose of protests surrounding surrogacy.
4] To suggest factors that could aid in solving problems surrounding this issue in adherence to SDG 3, 5, 10 and 16.

Abstract
In India, the topic of surrogacy has sparked significant debate and scrutiny, bringing the entire domain of assisted reproductive technologies into the spotlight. Controversies have arisen as the state has intervened to ensure that surrogacy practices adhere to ethical standards. To address these concerns, the Indian government enacted the Surrogacy (Regulation) Act, 2021, aimed at safeguarding women's reproductive rights. The legislation seeks to prohibit commercial surrogacy and support altruistic surrogacy, which involves no financial compensation beyond covering the surrogate mother's medical expenses and insurance. Additionally, bureaucratic challenges and the potential loss of revenue for the domestic surrogacy industry have fueled protests from advocacy groups and surrogate rights activists, highlighting the need for reforms to better balance regulation with the rights and needs of all parties involved.

"We believe very strongly that altruism in a patriarchal society like ours could lead to coercion," says Sarojini N, founder of Sama, the Delhi-based group working on women's health issues. Not remunerating a woman for reproductive labor is not enough to prevent exploitation, she argues. Bagri, N. T. (2021). A Controversial Ban on Commercial Surrogacy Could Leave Women in India With Even Fewer Choices. Retrieved September 6, 2024, from https://time.com/6075971/commercial-surrogacy-ban-india/

From a legal perspective, the Act has sparked concerns over ambiguities, particularly the ban on commercial surrogacy, which has created a gray area in legal practice and left many surrogates financially vulnerable. Clinicians have expressed concerns about the emotional and psychological toll on surrogate mothers, highlighting gaps in postnatal care and mental health support. These issues, while largely nonviolent, reflect deeper tensions in the public debate surrounding the Act, particularly in relation to symbolic or verbal violence reflecting broader societal inequalities.

This research, currently ongoing, employs semi-structured interviews to analyze the implications of the Act and its impact on prospective childless couples, single parents, and members of the LGBTQ community. The study adopts a qualitative approach, aiming to explore the nuanced perspectives of key stakeholders, including doctors, legal experts, and economically vulnerable women involved in surrogacy. With the support of both primary and secondary data, the research provides a broad view of the social, legal, and emotional challenges posed by the Act. Preliminary findings suggest that the Act complicates the surrogacy process, as true altruistic surrogacy may be unrealistic due to the challenges of finding a surrogate willing to provide services without compensation. This could potentially lead to under-the-table transactions. Additionally, the Act imposes restrictions on foreign couples, Indian couples with existing children, and limits options for the LGBTQ community and single parents.

The issue intersects with several Sustainable Development Goals (SDGs). The Surrogacy (Regulation) Act, 2021, touches on SDG 3 (Good Health and Well-being) by aiming to protect the health and rights of surrogate mothers, though its complexity might undermine this goal. SDG 5 (Gender Equality) is relevant as well, since while the Act seeks to address women's reproductive rights, it may inadvertently restrict choices for various groups. SDG 10 (Reduced Inequality) is impacted, as the legislation may exacerbate existing inequalities for LGBTQ individuals and single parents. Finally, SDG 16 (Peace, Justice, and Strong Institutions) is pertinent, highlighting the need for fair

and transparent practices in reproductive technologies to prevent illegal transactions and ensure equitable access to surrogacy services.

Keywords: Altruistic surrogacy, SDG, Surrogacy Regulation Bill, Reproductive Rights, ART clinics