3.3.2 Number of research papers per teacher in the Journals notified on UGC website during the year (2022-2023)

Ans.: 22 papers during the year (2022-2023)

INDEX

Sl. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Page No.
1.	Tamper Proof Air Quality Management System using Blockchain	Dr. Kamalakshi Naganna	CSE	IJACSA	May-23	2156-5570	3
2.	Review on Machine Learning for Resource Usage Cost Optimization in Cloud Computing	Dr. Lavanya N L	CSE	Malaysian Journal of Computer Science	06-12-2022	0127-9084	4
3.	Intelligent aging evaluation of polymeric insulators by inclined plane test	Dr. Ravi K N, Dr. Rekha S N, Mrs. Ashwini AV	EEE	International Journal of Intelligent Systems and Applications in Engineering	2023	2147-6799	5
4.	Experimental study on surface aging of polymeric insulators	Dr. Ravi K N, Dr. Rekha S N, Mrs. Ashwini AV	EEE	Neuro Quantology	2022	1303-5150	6
5.	Test source requirement for pollution study on insulators - A detailed study	Prof. Ramya M	EEE	Neuro Quantology	2022	1303-5150	7
6.	Ubicomp applications: case studies using location and sensing	Dr. Swetha K B	ISE	Ymer	Mar-23	0044-0477	8
7.	Enhancement of Atmospheric Turbulence Distorted images using wavelet packet transform	Dr. H.C. Sateesh Kumar	Electronics & Communication Engineering	International journal of scientific & technology research	2023	2277-8616	9
8.	Quasistatic Resonators based triple-mode notched microsrip bandpass filter	Dr. Shobha I Hugar	Electronics & Communication Engineering	Radio engineering	2023	1210-2512	10
9.	Design, synthesis, molecular docking and biological evaluation of novel pyrazole derivatives bearing quinoxalinone moiety as multi-targeted anticancer agents	Dr. A.M. Anusuya	Chemistry	Journal of Molecular Structure	2023	0022-2860	11
10.	Determination Of Vardenafil in Pure and Dosage Forms by Spectrophotometry	Dr. K P Roopa	Chemistry	Journal of Applied Spectroscopy	2022	0021-9037	12

Sl. No.	Title of paper	Name of the author/s	Department of the teacher	Name of journal	Year of publication	ISSN number	Page No.
11.	Photocatalytic and antimicrobial activities of biofunctionalized Ag nanoparticles derived from combustion method	Dr. K P Roopa	Chemistry	Results in Optics	July 2023	2666-9501	13
12.	Hydrochemical Analysis of Ground Water Quality in Anchepalya Industrial Area Kunigal Taluk Tumkur District	Prof. Y H Krishne Gowda, Prof. N Ravikantha	Chemistry	Materials Today	April 2023	1369-7021	14
13.	Intense red-emitting core-active shell Sio2@CaAl2O4: Eu3+ surface sensitive fluorescent probe for dactylography applications	Dr. B S Shashikala	Physics	Materials Chemistry and Physics	January 2023	0254-0584	15
14.	Production and Purification of Pectinase from Bacillus subtilis 15A-B92 and Its Biotechnological Applications	Dr. Veena S. More	Biotechnology	Molecules	Jun,2022	1420-3049	16
15.	Evaluation of Anti-Venom potential of Areca catechu Seed Extract on Bungarus caeruleus Venom	Dr. Veena S. More	Biotechnology	Separations	Nov,2022	2297-8739	17
16.	In-vitro evaluation of inhibitory, cytotoxicity and apoptotic effect of methanolic extract of calotropis gigantea on non-small cell lung cancer cells (a549)	Dr. Soumya C	Biotechnology	Gradiva	April 2023	0363-8057	18
17.	Extraction and characterization of starch from potato and corn	Dr. Shobha G	Biotechnology	Gradiva	April 2023	0363-8057	19
18.	Improved photocatalytic, antimicrobial and photoelectrochemical properties of nanocrystalline Cu2+-doped ZnO nanoparticles	Dr. Shobha G	Biotechnology	Ceramics International	April 2023	0272-8842	20
19.	Malabar Spinach (Basella alba), an Exotic Wonder Herb:A Review of Biomedical Applications	Dr. Veena S. More	Biotechnology	Latin American Journal of Pharmacy	April 2023	0326 2383	21
20.	Influence of Hot Forging and Heat Treatment on Mechanical Properties of D-Series Cutting Tools	Dr. Basavaraj Ganiger	Mechanical Engineering	Journal of Mines, Metals and fuels	AUGUST 2022	0022-2755	22
21.	Studies on Effective Usage of SAP ERP Tool to Control Materials Planned Delivery Time in Oil and Gas Industries.	Dr. Basavaraj Ganiger	Mechanical Engineering	Journal of Mines, Metals and fuels	AUGUST 2022	0022-2755	23
22.	Influence of cryogenic treatment on tungsten carbide cutting tool inserts in improving resistance to flank wear in machining c-45 steel	Dr. R.G Deshpande	Mechanical Engineering	High Technology Letters	Jul-23	1006-6748	24

Tamper Proof Air Quality Management System using Blockchain

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***Abstract*—One of the most important concerns facing urban regions across the world is air pollution. As a result, it's critical to monitor pollution levels and notify the public on the state of the air. An indicator called the Air Quality Index (AQI) does this by mapping the concentration of different contaminants into a single number. Because the examination of pollutant data is frequently opaque to outsiders, poor environmental control judgments may result. This has led to a need for a tamper-proof pollution management system for use by authorities, like the state and central pollution boards. To address these challenges, a model using machine learning algorithms to predict the air quality and store that information in the blockchain is proposed. Machine learning algorithms are used to categorize the air quality, and blockchain technology guarantees a permanent, tamper-proof record of all air quality data. Such a system might address the persistent issues with data dependability, immutability and trust in pollution control. The execution time of two main operations on blockchain are measured. The execution time of the put block is measured as 10 ms and the get block gets executed in 1 ms that fetches data from the blockchain ledger.**

Keywords*—Air pollution; air quality index; machine learning; blockchain technology

I. Introduction

Air quality refers to how well the air is suited for breathing by people, animals, and plants. An average healthy person breathes approximately 14,000 liters of air each day. As a result, poor air quality may have an effect on the quality of life for both the present and future generations by hurting human well-being, the environment, the economy, and urban sustainability.

AQI Category (Range)	PM_{10} (24hr)	$PM_{2.5}$ (24hr)	NO_2 (24hr)	O_3 (8hr)	CO (8hr)	SO_2 (24hr)	NH_3 (24hr)
Good (0-50)	0-50	0-30	0-40	0-50	0-1.0	0-40	0-200
Satisfactory (51-100)	51-100	31-60	41-80	51-100	1.1-2.0	41-80	201-400
Moderately polluted (101-200)	101-250	61-90	81-180	101-168	2.1-10	81-380	401-800
Poor (201-300)	251-350	91-120	181-280	169-208	10-17	381-800	801-1200
Very poor (301-400)	351-430	121-250	281-400	209-748	17-34	801-1600	1200-1800
Severe (401-500)	430+	250+	400+	748+	34+	1600	1800

Fig. 1. Air quality index (AQI) category range

The government keeps an eye on the air quality in various locations to determine the pollution level and to ensure that pollutant levels are within acceptable limits for human health. Air quality agencies can better plan how and when they will take action to safeguard the public's health by identifying how much pollution is present in a given location. Fig. 1 shows the AQI category range of the major pollutants.

The current technique for tracking industrial pollution is centralized, with a lack of openness and the possibility of data falsification. As a result, a consistent and tamper-proof mechanism must be utilized, such as secure software with data encryption and simultaneous data transfer directly to the regulator. Blockchain delivers Distributed ledger technology (DLT), which possesses the potential to solve many of the present system's open issues. Blockchain nodes are a network of multiple storage and computing devices that replicate data over a highly available and fault-tolerant infrastructure. Thus, blockchain facilitates the operation of a distributed database that is transparent and tamper-resistant. There is a need to design and develop an application using machine learning to predict Air quality category and store it on the blockchain that ensures it is tamper-proof and secure. The proposed system has three modules namely machine learning model, Blockchain network and Client application

The machine learning model is trained using industrial air pollution data. Supervised learning algorithms such as random forest classifier, decision tree classifier and Naive Bayes are used to predict the air quality index and the quality range of the given input data. The design of the ML model has these phases. The dataset comprises pollutant concentration information from over 15 industrial areas across India. This data set has around 37-40 pollutants, but the **seven** most appropriate pollutants are considered. The dataset is cleaned and partitioned into training and testing data. On comparing the results, best results were obtained from decision tree classifier with an accuracy of 99.6%.

The next module is the Blockchain network. The chaincode contains the ML model deployed in it. Once the client supplies the data to the blockchain, the chaincode that has the ML

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Review on Machine Learning for Resource Usage Cost Optimization in Cloud Computing

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Abstract: ***Small and medium-sized enterprises are increasingly adopting cloud computing, and optimizing the cost of cloud resources has become a crucial concern for them. Although several methods have been proposed to optimize cloud computing resources, these methods mainly focus on a single factor, such as compute power, which may not yield satisfactory results in real-world cloud workloads that are multi-factor, dynamic, and irregular.***
This paper proposes a new approach that utilizes anomaly detection, machine learning, and particle swarm optimization to achieve a cost-optimal cloud resource configuration.
The proposed solution works in a closed loop and does not require external supervision or initialization, learns about the system's usage patterns, and filters out anomalous situations on the fly.
litionally, the solution can adapt to changes in both system load and the cloud provider's pricing plan. The proposed solution was tested on Microsoft's Azure cloud environment using data collected from a real-life system, and the results show that it achieved an 85% cost reduction over a ten-month period..
Index Terms: cloud resource usage prediction, anomaly detection, machine learning, particle swarm optimization, resource cost optimization. .

I. INTRODUCTION

Cloud computing providers like Amazon Web Services (operated by Amazon), Azure (operated by Microsoft), and Google Cloud Platform (operated by Google) are popular locations for computer systems.
These clouds offer storage, network, and computing resources to users who need them. Different cloud usage models, such as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), reduce management effort and downtime risk while providing high scalability possibilities compared to on-premise solutions.
Scalability allows for the addition of new instances of services (PaaS), virtual machines (IaaS), or databases (which are partially SaaS and partially PaaS) as needed. However, it can be challenging to predict load beforehand, making it difficult to meet accessibility and responsiveness requirements.
Therefore, the system must be scaled up with a margin for unforeseen load spikes and long-term load changes, resulting in considerable power and storage overprovisioning and unnecessary spending To reduce costs and protect the environment, it is ucial to optimize cloud resource usage by predicting demand for different resources, such as CPU, memory, storage, and ...put/output operations per second (IOPS), and adjusting cloud components accordingly. Our proposed solution automates the process of scaling system components while taking into account the predicted usage level, including virtual machines, application services, and databases.
We use machine learning interpolation combined with anomaly detection to predict demand and optimize cloud components that meet the demand and are financially optimal. To achieve the optimal configuration, we use a particle swarm optimization (PSO) algorithm tailored to solving discrete problems.
The traditional approach to cloud resource optimization either focuses on a single resource, such as CPU, and scaling parameter, like the number of machines, or creates resource utilization models that ignore potential unexpected changes. Our proposed solution takes a more comprehensive approach that considers all resources, predicts demand, and adjusts cloud components accordingly, leading to significant cost reductions and environmental protection..

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Intelligent Aging Evaluation of Polymeric Insulators by Inclined Plane Test

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Abstract—Though polymers have tremendous advantages, but due to various disadvantages there usage has been limited. The main limitation is the surface ageing property of polymeric insulators. Though research on polymeric materials has been carried out, ageing properties are not determined exactly. In the present work, inclined plane tracking and erosion tests were carried out on specimen insulator material with different pollution severity prepared artificially. The effect of spacing between the electrodes used was studied by varying the distance between the electrodes. Further tests were also conducted on a section of the full-scale insulator of 66kV. Tests were conducted on specimen insulator material for 100 hours and the test samples were observed for their hydrophobicity property. The details of the experimental setup, the procedure followed, the results, and the discussions are presented in this paper. From the study carried out it was found that a lower severity is vulnerable to ageing of polymeric insulators, which is a valuable result as the surface condition along with electrical stress plays an important role in the ageing of the insulating material.

Keywords— *Polymer insulator, Pollution Severity, Ageing,IPTE test, Hydrophobicity*

I. Introduction

Generally, insulators produced were of porcelain and glass, which is widely used in overhead lines for transmission and distribution. However, in the early sixties, polymeric materials entered the insulation system and replaced ceramic insulators due to their numerous advantages. The main advantages are weight reduction compared to ceramic, reduced breakage, improved resistance to vandalism, and improved contamination performance.

Though polymers have tremendous advantages, their use has been limited due to their disadvantages.

The main limitation is the ageing property of polymeric insulators. Many difficulties were observed regarding their ageing performance. The factors responsible for polymers' aging are tracking and erosion, chalking and crazing, bonding failures, arcing and flashover, corona splitting and water penetration into the surface boundary, and reduction of hydrophobic properties. Though much work has been carried out on polymeric materials, ageing properties have not been understood thoroughly[1]–[9].

Polymeric insulators have very good hydrophobicity. This is another major advantage of the insulating material for its popularity. However, this property gets affected due to the various service conditions. Much work is still undergoing to understand the factors affecting the hydrophobicity of the polymeric insulating material[1]–[6], [9]–[21].

In the present work, inclined plane tracking and erosion tests were carried out on specimen insulator material with different pollution severity prepared artificially. The effect of spacing between the electrodes used was studied by varying the distance between the electrodes. Further, tests were conducted on a section of the full-scale insulator of 66kV. The details of the experimental setup, the procedure followed, the results, and the discussions are explained in the following subsections

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Experimental Study on Surface Ageing of Polymeric Insulator

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Abstract -

Polymeric insulators are widely used due to their excellent hydrophobic nature. Hydrophobicity gets affected due to surface degradation. The major environmental factor that affects the surface characteristics of the polymeric insulator is the deposition of contaminated water droplets on the surface of the insulator. In the present work, the effect of salinity of water droplets representing the contaminated water and the number of droplets on the surface of the polymeric insulator are experimentally studied. The behavior of flashover voltage due to the above factors was observed and a conclusion was drawn on how the flashover voltage behaves with an increase in salinity and also with the increase in the number of water droplets on the surface of the insulators. This study has resulted in an important conclusion that even though flashover is close to the surface, they occur at a lower value of voltages with the increase in salinity and number of droplets of water. This causes surface degradation and hence results in surface ageing of the material.

Keywords - flashover voltage, hydrophobicity, polymeric insulator, salinity, water droplets.
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1. Introduction

Initially, insulators made of ceramic and glass were employed. Since the beginning of high-voltage transmission, these insulators have been utilized in electrical equipment such as transformers, CT, PT, support insulators, isolators, etc. Transmission lines with voltages ranging from low to high employ these insulators. The performance of the insulation is important for a reliable power supply. Frequently referred to as ceramic insulators, porcelain insulators can withstand compressive or tensile stresses and have a longer lifespan. It has been in use for more than 110 years, and this ceramic insulation has a very long lifespan. Ceramic insulators currently have a lot of problems, while having a longer lifespan. Their main disadvantages are their weight and performance in a polluted environment. Every country wants to industrialize; therefore, environmental pollution is growing and causing flashovers across ceramic insulators. The length of the surface is not linearly correlated with the increase in transmission voltage as a result of the pollutant flashover that occurs on the ceramic insulator's surface. As a result, under conditions of medium and heavy pollution, a transmission system with a voltage higher than 220kV cannot operate with a ceramic insulator. Transmission companies apply measures like washing the insulators, increasing leakage distance, using multiple insulators, applying grease on the insulator surface, and applying Room temperature vulcanizing (RTV) coating on ceramic insulators, or using new polymeric insulators. Researchers felt it is necessary to invent a different insulation material, and as a result "polymeric insulators" were introduced in the 1960s. The polymeric insulator has more advantages than ceramic

Test source requirement for pollution study on insulators - A detailed study

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Abstract—
Test source for conducting pollution test shall replicate the field conditions to get accurate pollution flashover value. Source interaction with polluted insulator during test is very important. This paper focuses on a digital-computer simulation investigating the interaction between an artificially polluted insulator and a high-voltage alternating-current (AC) source configuration. The main objective is to analyze how different source parameters affect pollution performance. Detailed experiments were performed to assess the voltage drop under various conditions. Additionally, P-Spice was utilized to simulate the behavior of the sources. The findings from both the experimental and simulated studies are presented comprehensively within this work.An attempt is made inthis to try out correction for weak test sources.

Keywords— ***Test source, Pollution test, Scintillation, Source parameters***
DOINumber:10.48047/nq.2022.20.22.NQ10410 **NeuroQuantology2022;20(22):4107-4112**

I. INTRODUCTION

Pollution flashover, which is observed on insulators utilized in high-voltage transmission, constitutes a paramount challenge in power transmission.Under severe environmental conditions, pollutants accumulate on the surface of an insulator. When this polluted surface becomes damp due to factors like dew, fog, or rain, it forms a wet conducting film, leading to the flow of a leakage current across the surface.As the leakage current starts to dry the pollution layer, certain areas experience an increase in resistivity. This phenomenon gives rise to the formation of dry bands in regions with higher current density. These dry bands bear most of the applied voltage across them.In the presence of a dry band, a sparkover occurs with an arc spanning the gap of the dry band, which is connected in series with the wet portion of the insulator. These arcs are referred to as scintillations. At times, the arcs might extinguish when the current reaches zero, andthe insulator may return to its normal conditions.The process of dry band formation and subsequent rewetting can persist for many hours, and these arcs will burn in series with the wet surface resistance.

Whenever a scintillation occurs there is a dynamic shortening of creepage distance which will reduce the surface resistance and hence the leakage current dynamically increases. This increase in leakage current may cause some more dry band and hence few more scintillations may occur. If the number of scintillations occurring in line with the creepage length, simultaneously crosses the critical number then a flashover occurs along the length of the insulators.

To check the pollution performance of insulator in lab standard procedure have been drawn and test are being conducted as per IEC-60507[1]. To determine maximum, withstand severity of a string insulator consumes number of days of tests and this maximum severity must be higherthan site severity for good performance of insulators. In case of trials of creepage length variation, profile variation and material variations must be carried out, then it takes too much of time. Therefor an alternative study of pollution flashover and source interaction is very much necessary to access the performance of insulator analytically.

The flashover of the insulator is caused by a leakagecurrent which is the highest during the test occurs the number of scintillations crosses a critical number. By conducting several pollutions tests it is possible to determine the highest leakage current which causes the pollution flashover. This can be studied in the simulation study also.

The simulation of pollution flashover presents a highly intricate challenge owing to several factors. These

Ubicomp Applications: Case Studies using location and sensing Technologies.

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Abstract

Ubicomp Applications are the upcoming technologies in many fields of agriculture and healthcare. Applications for social and economic causes like healthcare and agriculture are benefited from technological innovation, which helps in quantitative and qualitative food production and in monitoring cardiac healthcare. Given the rate at which people are moving into cities, vertical farming is one of the agricultural technologies that is seen as the industry's future. Due to wireless sensor networks, ubiquitous computing in agriculture is notably growing in this set of quick processing (WSN). Without semantic compatibility with the Internet of Things, developing a context-aware system for the vertical farm is challenging (IOT). In this article, we suggest a vertical farm ontology that aids in understanding how the domain components relate to one another is considered as a case study. An example health-care prototype is used to provide a system overview. To achieve the accurate percentage of prediction of the Health Care on the dataset with a machine learning algorithm. Loading the dataset with proper cleaning and stemming with pre-processing and setting them for clustering and classification. Based on the classification we need to predict the percentage of patients with concrete reason based on the type of attributes which is crossing the threshold. This threshold should be generated by the mean weighted average vector. So proper boundary of accuracy comes for classification. For prediction-feasible algorithms, KNN is used. The suggested paradigm recomposes the data from the Internet of Things as context information, making it comprehensible to other systems. Our suggested concept will pave a great way for the development of intelligent and modern agricultural systems in the healthcare sector.

***Keywords**: Ubicomp application; Cloud server; Context-aware; IOT; ML algorithms.*

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Enhancement Of Atmospheric Turbulence Distorted Images Using Wavelet Packet Transform

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Abstract: Image enhancement is the process of sharpening image feature so that it is more suitable for some specific applications where the quality of the image is important for human perception. Here a multi-image enhancement technique which is based on wavelet packet transform is presented for the images distorted by atmospheric turbulence, where multiple low resolution images are processed to form a single high quality enhanced image. In wavelet packet transform both the approximation coefficients, which is the low frequency portion, and detailed coefficients, which is the high frequency portion of the previous levels, are used for processing in the next level. So without losing any part, the image can be represented with time-frequency information. This finds application in feature extraction and object recognition. Here first step is aligning the Region of Interest (ROI) from all input images using phase correlation method. Then it is combined in transform domain with the help of wavelet packet transform. Performance comparison parameters are calculated for the output image and it is compared with the parameters obtained from other techniques.

Index Terms: Atmospheric turbulence, Discrete wavelet transform, Phase correlation, Spatial frequency; Standard deviation, Wavelet packet transform.

1. INTRODUCTION:

Image enhancement sharpen of features like boundaries, edges and contrast so that it gives a better quality image compared to the original input image[2]. It has got application in the fields of satellite imaging, medical imaging [5][6] etc., and the resultant image can be used for applications such as segmentation, recognition and detection. In this image enhancement process, number of low resolution images are combined to form a single high quality enhanced image[9]. This way the amount of memory used to store multiple images can be reduced effectively. The enhanced image provides high spatial and spectral resolution. While capturing the image of a moving object from hot roads or deserts, atmospheric turbulence is a serious issue affecting the visual clarity. The various atmospheric distortions affecting the image clarity are fog, haze and atmospheric turbulence, which is caused by the temperature variation in hot roads and deserts. When the ground is heated by solar radiation, the air above the ground gets heated up, resulting in atmospheric turbulence caused by the mixing of hot and cold air. This creates horizontal layers of aerosols and changes the refractive index. As the variation in temperature between the ground and the air above it increases, the layer thickness will get reduced. This causes the layers to move upward. These variations in density of atmosphere in a line of sight with an object cause intensity fluctuations. Apparent position of an object will be altered because of the variations in the refractive index of a cell of air in front of the camera. Collectively these effects cause the individual parts of the image to move in different directions. The reduction of this distortion is difficult with a single image. So a set of images are used for the atmospheric turbulence reduction, resulting in one enhanced image.

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When the multiple images of a same seen are captures, there will be a small relative motion between the scene and the camera. In such cases it is required to register or align the region of interests. In this paper, a new image enhancement technique based on wavelet packet transform is proposed for the images distorted by atmospheric turbulence effect. The advantage of using Wavelet Packet Transform is that in Wavelet Packet Transform both approximate and detailed components will be processed in each step. It helps in getting the optimal representation of the image. For higher frequency components in image, discrete wavelet transform can cause problems, as in discrete wavelet transform, only the approximation coefficients (low frequency part) of the previous level is processed in the next level. So the high frequency coefficients are not used in the further steps, and the high frequency part of the image are lost. The frequency resolution of the decomposition filter will not be good enough to take out information from the decomposed components of the image. In wavelet packet transform, both the approximation coefficients, which is the low frequency part and detail coefficients, which is the high frequency part of the previous level are used for processing in the next level. So without losing any part, the image can be represented with time-frequency information. This method can be implemented in image enhancement, for obtaining a good quality image. Also the atmospheric turbulence effect, which occurs while capturing images from hot roads or deserts, can be reduced by applying this image sequences. The rest of the paper is organized as follows. Section 2 gives the details of different papers referred. Section 3 describes the proposed enhancement technique and different performance comparison parameters that are used for checking the performance of the enhancement method. Section 4 discusses about the output and comparison of the parameters calculated using different methods. Section 5 is conclusion and future work.

2 LITERATURE REVIEW

The literature survey is mainly done on the image enhancement and various enhancement techniques. Rodrigo

Quasistatic Resonators Based Triple-Mode Notched Microstrip Bandpass Filter

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Abstract. *This article discusses new approach for design and development of triple-mode notched microstrip bandpass filter based on quasistatic resonators (QR). The proposed approach is composed of two quasistatic resonant elements; Horizontal Plane Split Ring Resonator (HP-SRR), Vertical Plane Split Ring Resonator (VP-SRR) and a single Asymmetric Step Impedance Resonator (A-SIR) with parallel coupled feed structure. An additional attenuation pole realized by VP-SRR in desired passband tunes the dual-mode response to triple mode and enhances the 3dB bandwidth without changing the dimensions of basic the filter cell. The HP-SRR realizes a notch at WiMAX band (IEEE 802.11a lower band) in the desired passband. Further by changing the impedance of VP-SRR and HP-SRR both the location of additional attenuation pole frequency and notch band can be controlled. The proposed approach eliminates conventional method of realizing notch in the desired passband using vias and defective ground structures which have practical difficulties in realization and also the proposed approach results in compact notched wideband filter design.*

Keywords

Dual-mode, quasistatic resonators, asymmetric step impedance resonator, split ring resonators

1. Introduction

The continuous evolution in wireless communication technology demands advanced microwave components like compact filters. In literature a number of multimode bandpass filters such as dual-mode, triple-mode, quadruple-mode BPFs have been designed to meet the requirements of wireless communication industry. The dual-mode BPFs in [1–3] have been designed using closed loop, meandered dual-mode resonators like octagonal, hexagonal, star shaped resonators. The triangular, square patch resonators with corner cuts [4], [5] have also been proposed to design dual-mode BPFs. However all these reported filters have narrow bandwidth. Further to improve the bandwidth multimode resonators, coupled line structures and hairpin resonators have been proposed in [6–8]. But all these filters have larger footprint. The triple-mode BPFs reported in [9–11] have fabrication difficulties as they use via hole for grounding. Quadraple mode resonators have been used to design wideband filters in [12], [13]. Even through these filters provide wide bandwidth but have less frequency selective passband due to absence of transmission zeros at the passband edges. Besides these wideband BPFs, notched bandpass response filters have also been reported in literature since for some applications there is a need to avoid the interference from existing wireless communication systems such as WiMAX network. In literature these notched-band BPFs have been designed using parallel coupled T shaped SIR, trisection SIRs, parallel coupled trisection resonators with complementary split ring resonator (CSRR) [14–16], defective microstrip structures (DGS) [17–19]. Vias proposed in [20] to realize a notch are not practically feasible. Authors Jingbo Liu and Ting Zhang in [21], [22] have also proposed tuning of notch band frequency by varying length and width of via grooves and length of short stubs which has practical difficulties.

In this article, we propose a novel approach for design and development of triple-mode notched microstrip bandpass filter based on quasistatic resonators (QR); HP-SRR and VP-SRR. The proposed approach uses a single A-SIR with one step discontinuity as shown in Fig. 1. With proper selection of impedance ratio R and length ratio U for asymmetric stepped impedance resonator (A-SIR), first two resonant modes of the resonator are coupled to attain dual-mode response. Using parallel coupled feed structure, the two resonant modes of the resonator are coupled strongly and transmission zeros at upper and lower passband edges are realized to achieve high frequency selective passband. By integrating VP-SRR on low impedance sec-

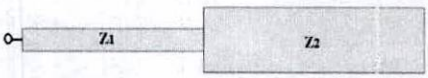

Fig. 1. Asymmetric step impedance resonator (A-SIR).

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Design, synthesis, molecular docking and biological evaluation of novel pyrazole derivatives bearing quinoxalinone moiety as multi-targeted anticancer agents

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Quinoxalinone
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Thymidylate synthase
EGFR
Molecular docking

ABSTRACT

Based on a multitarget-directed drug design technique, a series of new quinoxalinone-based pyrazole derivatives (**4a-h**) were designed and synthesized. The potency of newly synthesized molecules to inhibit the anti-proliferation of the human cancer cell lines MCF-7 (breast), HCT-116 (colon), and A549 (lung) was examined. The most effective compounds against the examined cancer cell lines were **4e, 4f**, 4 g, and 4 h. Among these, compounds **4e** and 4 h had a strong anticancer activity that was equivalent to sorafenib. The capacity of the potent compounds (**4e, 4f**, 4 g, and 4 h) to inhibit the *in vitro* activity of the thymidylate synthase (TS) enzyme, BRaf, and EGFR kinases was also tested. With IC_{50} values for the TS enzyme, BRaf kinase, and EGFR kinase ranging from 1.16 to 2.97 μM, 1.28 to 3.69 μM, and 1.93 to 4.28 μM, respectively, all the investigated compounds showed a noticeable inhibitory action. Among the synthesized hybrids, compound 4 h showed IC_{50} value of 2.04, 2.69 and 1.93 μM against MCF-7, HCT-116, and A549 cell line, respectively, and 1.16, 1.28 and 1.93 nM against TS, BRaf and EGFR kinase enzyme, respectively. All of the synthesized hybrids adhered to Lipinski's guidelines, which suggested that they would have favorable oral drug-like qualities. To determine the probable interaction between the potent compounds and the TS active site, molecular docking study was conducted.

1. Introduction

The primary worldwide health issue and one of the leading causes of mortality is cancer, which is caused by the abnormal division and spread of cells [1]. To hasten tumor growth, proliferation, and motility, cancer is characterized by an increase in several complicated signaling pathways. To fulfill its anticancer goals, targeted chemotherapy slows the proliferation of cancer cells, making it a key tool in the fight against the disease [2]. As of right now, there are no fully effective and practical medications or methods to stop this disease's unrelenting progression [3]. Apoptosis, which effectively stops tumor cell growth, can be induced by decreasing the DNA synthesis of tumor cells since the level of DNA synthesis in tumor cells is considerably higher than that in normal cells [4]. As a result, the creation of medications designed to operate against a specific target with high potency and selectivity has received considerable attention in the discovery of chemotherapeutic treatments [5].

Because of their crucial function in DNA manufacture, thymidylate synthase (TS) has attracted attention in cancer treatment [6]. Deoxythymidine monophosphate (dTMP), a direct precursor for DNA synthesis, is created by TS from deoxyuridine monophosphate (dUMP), which is then further phosphorylated to generate the triphosphate group (dTTP) [7]. The absence of thymine that arises from TS inhibition is fatal to the majority of actively dividing cells. Through DNA damage and thymidylate depletion, inhibition of TS eventually results in cell death [8]. TS is consequently viewed as a prime candidate for cancer

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DETERMINATION OF VARDENAFIL IN PURE AND DOSAGE FORMS BY SPECTROPHOTOMETRY

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Three simple, sensitive, precise, and rapid spectrophotometric methods are developed and optimized for the assay of vardenafil in pharmaceutical formulations. The procedures are ascertained on the oxidation of vardenafil with a slight excess of N-bromosuccinimide (NBS), and the unreacted oxidant is estimated by evaluating the amount of the unconsumed NBS by reacting with a fixed amount of safranin (method A), crystal violet (method B), and aniline blue (method C) in an acidic medium by measuring the absorbance at 530, 600, and 610 nm, respectively. In all the methods, the amount of NBS consumed corresponds to the amount of the drug. Beer's law range, Sandell's sensitivity, and the corresponding molar absorptivity values of 1.1104 × 10^4, 1.0305 × 10^4, and 6.217 × 10^3 L/mol × cm for methods A, B, and C are calculated. The limits of detection and quantification are evaluated. The methods are also evaluated statistically by means of Student's t-test and F-test. The results show excellent agreement and insignificant difference between the proposed methods and the reference method. The developed methods are successfully applied to the assay of Vardenafil in pure and dosage forms, and no interference is observed from common excipients present in pharmaceutical formulations.

Keywords: *drug research, N-bromosuccinimide, redox reaction, vardenafil, UV-Vis spectroscopy.*

Introduction. Vardenafil (VAR) is a benzene sulfonamide derivative and selective potent inhibitor of specific phosphodiesterase type 5 with vasodilatory activity. It is chemically designated as a sulfa group of 4-ethoxy-3-(5-methyl-7-propylimidazo[5,1-f][1,2,4]triazin-4(1H)-one-2-yl) benzenesulfonic acid and the secondary amino group of 4-ethylpiperazine. It is used in the treatment of male erectile dysfunction (impotence) and pulmonary arterial hypertension (PAH) [1–3]. It is also used as an effective therapy for cardiovascular diseases.

A few methods have been reported for VAR in pharmaceutical dosage forms and in biological fluids, including atomic emission spectrometry [4], electro kinetic capillary chromatography [5], electrochemical method [6], gas chromatography [7, 8], LC-MS [9], ultra-performance liquid chromatography [10], high performance liquid chromatography [11], RP-HPLC [12], UV-chemometric and HPLC-QbD [13], RP-HPLC, and UV-spectroscopy [14], RP-UPLC [15], pharmacokinetic study [16], extractive spectrophotometry [17], spectrophotometry [18–23], and thin layer chromatography [24].

Most of the aforementioned methods are complex, time-consuming, inaccessible for routine drug monitoring, and require expensive equipment. In contrast, visible spectrophotometry is one of the most convenient analytical techniques due to its simplicity and reasonable sensitivity with significant economic advantages, finding wide application in all quality control laboratories and pharmaceutical industries in the examination of various groups of drugs.

Reviewing the literature, we have noted that few papers have been published on the problem of the determination of VAR by spectrophotometric methods, and of those methods reported they suffer from one or another drawback such as drastic experimental conditions, utility of organic solvents, longer standing time, poor sensitivity, and a narrow linear range. Therefore, the development and validation of new spectrophotometric methods for the determination of VAR that can overcome the drawbacks of the presented methods are essential.

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Photocatalytic and antimicrobial activities of biofunctionalized Ag nanoparticles derived from combustion method

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ARTICLE INFO

Keywords:
Silver nanoparticles
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Photocatalytic
Indigo carmine dye

ABSTRACT

The major global concern for human life is due to the toxic impact of synthetic dyes and hazardous microorganisms (bacteria). In this view, much research is focused on the antimicrobial and photocatalytic activities by preparing metallic-natured metal nanoparticles either through chemical or bio-/green-mediated methods. In this aspect, in the present work, we demonstrate the synthesis of silver nanoparticles (AgNPs) by a simple well-known chemical method, the solution combustion synthesis (SCS) method. The prepared AgNPs were subjected to various structural, optical, antimicrobial, and photocatalytic studies. In particular, we have explored the influence of AgNPs on S. aureus, B. subtilis, P. aeruginosa, and E. coli bacteria to investigate antimicrobial behavior activities. Structural studies by XRD and TEM results reveal the formation of crystalline, nano-sized AgNPs by SCS due to the exothermicity of the fuel used in the synthesis. Optical studies by UV–visible spectroscopy reveal the presence of surface plasmonic resonance (SPR) peak at or around 440 nm, which signifies the formation of AgNPs in accordance with the XRD and TEM results. The synthesized AgNPs demonstrated potential antimicrobial activity against the bacteria *S. aureus, B. subtilis, P. aeruginosa, and E. coli.* The zone of inhibition surrounding *B. subtilis* is the most susceptible of the tested bacteria. Furthermore, AgNPs showed remarkable photocatalytic activity in the degradation of indigo carmine dye.

1. Introduction

In biomedicine, nanotechnological materials are rapidly being researched for use as antibacterial agents (Mba and Nweze, 2021). Physicochemical methods for making nanoparticles (NPs) have been replaced mainly by environmentally friendly biological processes (Castillo-henr et al., 2020; Das et al., 2017). Multidrug resistance has now impacted the world, posing significant challenges in treating infectious diseases caused by microbial pathogens (Lee et al., 2019; Abadi et al., 2019). This is primarily due to antibiotics' widespread use in human, agricultural, and veterinary drugs. Controlling dangerous bacteria is unavoidable since human existence develops at a rapid pace. Although many microorganisms coexist peacefully with humans, their fast and uncontrolled growth can cause significant difficulties. Nosocomial infections are just one of those issues that plague the world, and preventing their spread, particularly in hospitals, is a paramount concern (Abbas et al., 2019). Antibiotics are often utilized to prevent microorganisms from growing and breeding.

Nevertheless, the emergence of resistance and side effects has significantly hampered the usage of such drugs (Manyi-Loh et al., 2018). The performance of numerous categories of antimicrobial NPs and nanocarriers has been proven in treating infectious diseases in recent years, owing to the unique physicochemical features of nanoscale biological substances (Siddiqi et al., 2018). In addition, replacing present

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Hydrochemical analysis of ground water quality in Anchepalya industrial area Kunigal taluk Tumkur district

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Ke s:
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Anchepalya industrial area
Kunigal taluk

ABSTRACT

Water is one of the prime necessities for survival life. We cannot live even for a few days without water. The present work is aimed at analysis of water quality for the ground waters of industrial areas in Kunigal taluk Tumkur district in India. To meet present and future needs with the currently available surface and groundwater resources. Ten groundwater samples were collected from different sites of industrial areas in Kunigal taluk for hydrochemical analysis.The parameters observed were pH, TDS (Total Dissolved Salts), TH (Total Hardness), TA (Total Alkalinity), Cl^-, F^-, Ca^{2+}, Mg^{2+}, Na^+, K^+, Sulphate, Nitrate, Chromium and Lead. The observed values were compared with standards prescribed by WHO (2021). The data show that the quality of groundwater is grossly polluted and not fit for drinking; hence, it has to be treated by reverse osmosis process and different Chemical treatment methods before being used for drinking and domestic purpose.

Selection and peer-review under responsibility of the scientific committee of the International Conference on Applied Research in Engineering Sciences.

1. Introduction

Water was found on Earth approximately 3 billion years ago. That was the time when the oceans were formed and the first life forms originated in the oceans through a process called Abiogenesis. It is the most abundant substance on the Earth and is universally present in air, clouds, oceans, streams, springs, or glaciers. On the globe, nearly 80% of the water is present in the oceans and most of the fresh water is trapped in icebergs [1].

Twenty percent of the entire world's population lives in areas suffering from physical scarcity of water. Today, water scarcity is af... ıg all continents. As many as 783 million people in the world do ...t have access to clean and fresh potable water.

Approximately 1/3th of the Indian villages are without any access to fresh water even today. The demand for water in India is increasing day by day, whereas water availability is fast decreasing. [2].

Human activities are responsible for the present day ground water crises. Due to population overgrowth the groundwater extractions exceed the recharge [3]. Presently, 20 million bore wells pumping water in our country with free power supply provided by the government so fast depleting groundwater.

1.1. Study area

Anchepalya Industrial area is located in the Taluk of Kunigal, Tumkur district. Anchepalya is a small Village/hamlet in Kunigal Taluk. It comes under the Bettahalli Panchayath. It is located 40 KM south of the District headquarters in Tumkur. Eleven KM from Kunigal, 66 KM from the State capital, Bangalore.

1.2. Methodology

Ten ground water samples were collected from different sites in the Anchepalya Industrial area of under Bettahalli Panchayath. The water samples are collected in plastic bottles which is Properly cleaned and rinsed with distilled water is used having capacity of 1.0 L. Parameters such as pH, TDS were measured on the spot during the sampling collecting by using Systronics make Water analyzer kit-371. Total Hardness (TH), TA (total alkalinity), and major ions like Ca^{2+}, Mg^{2+}, chloride were determined using the volumetric method, Turbidity is measured by using Nephelometer, Na^+, K^+, Fluoride, Nitrate and Sulphate were estimated using Sys-

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Intense red-emitting core-active shell SiO_2@$CaAl_2O_4$:Eu^{3+} surface sensitive fluorescent probe for dactylography applications

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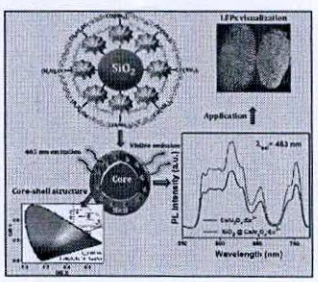
HIGHLIGHTS

- Intense red emitting core-shell SiO_2@-$CaAl_2O_4$:Eu^{3+}(7mol %) structures were fabricated via ultrasonication route.
- The SiO_2@$CaAl_2O_4$:Eu^{3+}(7 mol %) structures exhibit ~ 1.6-fold enhancement in the emission intensity as compared to NPs.
- A new fluorescence based platform has been setup for *in-situ* visualization of latent fingerprints by powder dusting method.
- Developed latent fingerprints shows superior contrast, sensitivity, efficiency, selectivity and negligible background hindrance.

GRAPHICAL ABSTRACT



ARTICLE INFO

Keywords:
Ultrasonication
Core-shell structures
Photoluminescence
Latent fingerprints
Solid-state lighting

ABSTRACT

Rational design and synthesis of hierarchical core-shell structures have been regarded as an operative approach to enhancing the luminescence performance of the phosphors. In this work, intense red-emitting $CaAl_2O_4$:Eu^{3+}(1–9 mol %) nanophosphors and SiO_2@$CaAl_2O_4$:Eu^{3+}(7 mol %) structures were fabricated by the ultrasound-assisted sonochemical route. The powdered x-ray diffraction studies of prepared core-shell structure confirm the monoclinic phase of the $CaAl_2O_4$ layer and amorphous SiO_2 cores. The morphological and elemental analysis clearly evidences the formation of spherical and uniform core-shell structures. Upon 463 nm excitation, the photoluminescence emission spectra of $CaAl_2O_4$:Eu^{3+}(1–9 mol %) nanophosphors consist intensive and sharp peaks at ~ 507, 532, 551, 615, 654, 702 and 759 nm, owing to $^5D_1 \rightarrow {}^7F_2$, $^5D_0 \rightarrow {}^7F_0$, $^5D_0 \rightarrow {}^7F_1$, $^5D_0 \rightarrow {}^7F_2$, $^5D_0 \rightarrow {}^7F_3$, $^5D_0 \rightarrow {}^7F_4$ and $^5D_0 \rightarrow {}^7F_5$ transitions of Eu^{3+} ions, respectively. Almost 1.6-fold enhancement in the emission intensity without any change in the spectral shape was noticed in core-shell SiO_2@$CaAl_2O_4$:Eu^{3+}(7 mol %) structures as compared to $CaAl_2O_4$:Eu^{3+} (7 mol %) nanophosphor, which attributed to the improved surface area,

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molecules

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Article

Production and Purification of Pectinase from *Bacillus subtilis* 15A-B92 and Its Biotechnological Applications

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Abstract: Enzymes that degrade pectin are called pectinases. Pectinases of microbial origin are used in juice clarification as the process is cost-effective. This study screened a pectinase-producing bacterium isolated from soil and identified as *Bacillus subtilis* 15A B-92 based on the 16S rRNA molecular technique. The purified pectinase from the isolate showed 99.6 U/mg specific activity and 11.6-fold purity. The molecular weight of the purified bacterial pectinase was 14.41 ± 1 kD. Optimum pectinase activity was found at pH 4.5 and 50 °C, and the enzyme was 100% stable for 3.5 h in these conditions. No enzymatic inhibition or activation effect was seen with Fe^{2+}, Ca^{2+}, or Mg^{2+}. However, a slight inhibition was seen with Cu^{2+}, Mn^{2+}, and Zn^{2+}. Tween 20 and 80 slightly inhibited the pectinase, whereas iodoacetic acid (IAA), ethylenediaminetetraacetate (EDTA), urea, and sodium dodecyl sulfate (SDS) showed potent inhibition. The bacterial pectinase degraded citrus pectin (100%); however, it was inactive in the presence of galactose. With citrus pectin as the substrate, the Km and Vmax were calculated as 1.72 mg/mL and 1609 U/g, respectively. The high affinity of pectinase for its substrate makes the process cost-effective when utilized in food industries. The obtained pectinase was able to clarify orange and apple juices, justifying its application in the food industry.

Keywords: screening; citrus pectin; pectinase; *Bacillus subtilis* 15A-B92; purification; juices clarification

1. Introduction

Pectinases hydrolyze pectic compounds linked by α-1,4-glycosidic bonds and esterified with methyl groups. Pectins, protopectins, and pectinic acids or polygalacturonic acids are the main constituents of heterogenic pectic substances. Based on their mode of action, pectinases are classified as polygalacturonases that hydrolyze unesterified polygalacturonic acid substances, pectin esterases, pectin lyases that de-esterify pectin into pectate and methanol, and pectate lyases or polymethylgalacturonases that catalyze β–elimination, forming galacturonides. Polygalacturonases, pectin lyases and pectate lyases have been found to show the highest activity among the pectinases. A homology at the sequence level between these pectinolytic enzymes has also been observed. The main natural sources of pectinases are bacteria, fungi, and plants [1,2].

separations

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Article

Evaluation of Anti-Venom Potential of *Areca catechu* Seed Extract on *Bungarus caeruleus* Venom

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Abstract: *Areca catechu* seeds and their extract/s are currently used to treat various ailments and infections including snakebites. The purpose of this investigation was to assess the inhibiting/neutralizing effect of ethyl acetate and aqueous ethanolic seed extracts of *A. catechu* on *Bungarus caeruleus* (krait) venom. The enzyme activities and their inhibition were evaluated using standard procedures (in vitro). In vivo studies were conducted using chick embryos and murine models. The extracts inhibited hyaluronidase and phospholipase A_2 activities. Protease activity was neutralized by the aqueous ethanolic extract only. The IC_{50} value of aqueous ethanolic extract for hyaluronidase was 0.001 g/mL, while that for the ethyl acetate extract for phospholipase A_2 was 0.006 g/mL. In addition, both the extracts neutralized the indirect hemolysis and fibrinogenolytic activity induced by *B. caeruleus* venom. The LD_{50} for the chick embryos was 4.9 µg/egg. The 50 and 100 µg aqueous ethanolic extracts neutralized the LD_{50} and the challenging dose ($3LD_{50}$) of venom effectively in the chick embryo model. The LD_{50} of *B. caeruleus* venom in mice was 0.1927 µg/kg; the extract extended the survival time of the mice from 25 min to 30 and 35 min in 1:10 and 1:20 ((*w*/*w*) venom:extract) ratios, respectively. The extract also neutralized myotoxic activity. The *A. catechu* seed extract showed promising inhibitory properties against *B. caeruleus* venom. In this regard, academia and industries should work collaboratively to develop and formulate a cost-effective first-aid drug.

Keywords: *Areca catechu*; *Bungarus caeruleus*; fibrinogenolytic activity; haemolytic activities; lethal toxicity; chick embryo

1. Introduction

A snakebite is a hazardous occupational and environmental injury. It is a neglected tropical injury, and is also dangerous in other zones [1,2]. In India, 216 species of snakes

Research article

IN-VITRO EVALUATION OF INHIBITORY, CYTOTOXICITY AND APOPTOTIC EFFECT OF METHANOLIC EXTRACT OF *CALOTROPIS GIGANTEA* ON NON-SMALL CELL LUNG CANCER CELLS (A549)

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ABSTRACT:
Non-small cell lung cancer is the most frequent type of lung cancer (NSCLC). Herbal medicines have been utilized for primary health care from ancient times to the present day. *Calotropis* plant parts have pharmacological activity, such as cytotoxic activity, anti-bacterial activity, antioxidant activity, cytotoxic activity, wound healing activity, and so on. The study was done in vitro to determine the inhibitory and cytotoxicity activity of various concentrations methanolic extract of *Calotropis gigantea* on A549 lung cancer cells. The experiment showed Considerable activity of the samples at different concentrations. Test extracts, *C.gigantea* at multiple test concentrations ranging from 10µg/ml to 160µg/ml in a two-fold dilution series was tested and the data obtained suggests that the test sample has shown scavenging activity up to 61.04% inhibition with an IC50 of 76.13µg/ml. The toxicity of samples on RBCs was evaluated by hemolysis assay; the results suggested that sample has lesser hemolytic activity in the concentrations, selected for cytotoxicity study. The Cytotoxicity of the samples was tested on A549 lung cancer cells using MTT assay. The samples *C.g* have shown activity having an IC50 value of 118.7µg/ml respectively. Based on the IC50 value, phase arrest in the cells were determined by Flow cytometer and it was found that *C.g* showed up to 20.03% S phase and 15.14% G2 phase arrest upon treatment and it was observed that there were 1.33 fold expressions at higher concentration of treatment. The data was further investigated at the transcriptional level by qRT-PCR of P_{53} expression.

Keywords: Antioxidant, *Calotropis gigantea*, Cytotoxicity, Flow cytometer, Gene expression.

1.INTRODUCTION: All over the world, lung cancer is a major cause of cancer-related death in both men and women. Lung cancer has gone from being a rare illness to a worldwide epidemic and public health concern [1]. The major risk factor for lung cancer is cigarette smoking. Lung cancer starts in the cells of the lungs and can spread (metastasize) to other parts of the body. The two kinds of lung cancer are small cell lung cancer (SCLC, which accounts for about 15% of instances) and non-small cell lung cancer (NSCLC, which accounts for about 85% of cases) [2]. Currently, surgery, chemotherapy, radiation, hormones, and immunotherapy are the most common cancer treatments, which are frequently complemented with complementary and alternative therapies such as herbal medications. Chemotherapy is the most widely utilized treatment, although it has a number of drawbacks, including limited effectiveness, high toxicity, and multidrug resistance [3].Plants have long been utilized to treat cancer, and they continue to be a significant source of novel medicines [4]. Plants, which contain a large number of bioactive compounds, are the main source of natural herbal medicines that are helpful against a variety of diseases, including cancer, and these bioactive components are linked to plant biological activities [31, 32]. One of the most appealing approaches to lung cancer treatment has been found as herbal medicines. because They've been demonstrated to be useful and effective in sensitizing conventional drugs, extending patient survival time, reducing chemotherapy side effects, and increasing the quality of life of lung cancer patients[5].*Calotropis gigantea* (L.) R. Br *(Cg)* (Apocynaceae) locally known as 'badabadam' or 'erruku' is common to Africa and Asia and widely available throughout India [6]. The plant features oval, light green leaves, a milky stem, and clusters of waxy white or lavender blooms. *C. gigantea* is commonly found in India and is utilized for a variety of medicinal uses in the traditional medical system [7]. *C. gigantea* has been experimentally reported for a variety of therapeutic qualities [8]. Leaves and areal parts of the plant are reported for anti-Candida activity [9] and antibacterial activity [10], antioxidant activity [11]. In Ayurveda, the *C.g* root and leaf extracts are used for the treatment of asthma, bacterial infections (syphilis), while the bark is used for improving several liver and spleen ailments. Extracts of CG have also shown efficacy against several cancers, including lung, liver, and colon cancers by increasing caspase activity and reducing the expression of antiapoptotic proteins [29, 22]. The majority of the compounds isolated from *C.g* showed cytotoxic activity, which was either established in cell-based assay system or in animal models. Calotropin elucidated potent cytotoxic effects against many pure cancer cell lines [30]. The objective of the present study was to evaluate the antioxidant activity and cytotoxicity of methonolic extract of *C. gigantea* on A549 lung cancer cell line.

2. MATERIALS AND METHODOLOGY:

2.1 Phytocompound extraction: Weighed 20g of dried Sample powder and dissolved it in 100ml Methanol in a beaker coated with aluminum foil. The beaker was then placed on a hot water bath at 50 degrees Celsius for 3 hours. The extract was filtered with Whatmann filter paper after the incubation time, and the filtrate was collected in a 50ml beaker. The residue on the filter paper was discarded, and the filtrate was taken to be used later. The filtrate was then held at 60°C for a few hours until the extract was fully dry and semisolid. The yield was calculated after weighing this semi-solid sample.

2.2 Phytochemical analysis:
2.2.1Test for Alkaloids: Dragendoff's test was used to detect alkaloids: 0.2ml of sample was obtained and 0.2ml of HCl was added.

Extraction and Characterization of Starch from Potato and Corn

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Abstract: *The starch was extracted and processed using an agricultural product such as potato, corn is most commonly used in applications in the food industry, agricultural industry, dairy industry, paper industry, the textile industry as a binder, texture modifier, thickener, bulking agent, fat replacer, and more. The property of starch includes carbohydrate, polysaccharide, and non-reducing sugar. Starch mainly has two polymers namely amylose and amylopectin. The starch was extracted and characterized from potato and corn. The results revealed that the pH of the potato starch and corn starch was obtained as 7 and 6 respectively. The results revealed that the pH of the potato starch and corn starch was obtained as 7 and 6 respectively, the blue value indicating higher amylose content for corn starch, and the shape of starch granules in potato and corn were observed as round oval shape and size varied from 5-120 microns.*

Keywords: *Starch, Potato, Corn, Amylose, Insoluble.*

1. Introduction:

Most plants/crops include starch, a water-insoluble polymer found in cereal plants such as rice, waxy rice, waxy maize, and wheat; root/tuber plants such as potato, sweet potato; and legume plants such as lentil, bean, and pea. Starch can be modified physically, chemically, and enzymatically for a variety of applications in various industries, including use as a binder, texture modifier, thickener, bulking agent, fat replacer, and more. It is a major component in many industries, including paper, mining, pharmaceutical, textile, and food. Starches are utilized in blending and as thickening specialists in baked products, withstanding their fundamental food purposes. Starch is utilized in the development of paper to build its energy and is likewise used in the floor measuring of paper. Creased paperboard, paper things, boxes, and gummed paper and tape are undeniably made with starch. A lot of starch is likewise utilized in the material business as twist estimating, which stimulates the string while at the same time winding around.[1]

The properties of starch include:
Starch as a carbohydrate - Starchy food sources are our principal source of sugar, and they are a significant piece of a reasonable eating regimen. The food sources incorporate such as potatoes, bread, rice, pasta, and cereals.
Starch is a polysaccharide - Polysaccharides are a kind of natural polymer with many applications. Their capacity in living organic entities is for the most part connected with development or capacity. Starch is found in amylose and spreading amylopectin types in plants and is utilized as a storing polysaccharide.
As a non-reducing sugar, starch an extraordinary sugar-decrease test requires more than one hemiacetal "needle" in a bundle of "acetals."

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Improved photocatalytic, antimicrobial and photoelectrochemical properties of nanocrystalline Cu^{2+}-doped ZnO nanoparticles

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Abstract

Herein we present the first report on the synthesis of Cu^{2+}-doped ZnO nanoparticles via the solution-combustion using a new fuel (Glutamine). Systematic studies were carried out to assess the influence of Cu^{2+}-concentration on photocatalytic, antimicrobial, and photoelectrochemical characteristics through various characterizations such as XRD, SEM-EDS, FTIR, UV–Visible, photocatalytic, antimicrobial, photoelectrochemical and Photoluminescence. XRD results show the formation of single-phase nanocrystalline particles and the substitution of Cu^{2+} at the Zn^{2+} site without the occurrence of impurity phases. SEM & EDS analysis revealed almost spherical particles and nominal (measured and experimental) element compositions. The structural changes induced due to the substitution of Cu^{2+} into the ZnO host lattice are evident in FTIR data, which show the presence of stretched ZnO bonds. The band gap narrowing effect was observed up to 5 mol% Cu^{2+} and thereafter band gap widens. PL spectra exhibit multiple emission peaks related to defects present in the host ZnO induced by the Cu^{2+} & PL intensity increases with the increase of doping concentration up to 3 mol % of Cu^{2+} beyond that its decreases with increasing concentration. The prepared NPs demonstrate promising photocatalytic activity against MB dye in both the UV and visible ranges. The maximum 94% percentage degradation was recorded for 9 mol% CuZnO, which is the highest among CuZnO NPs reported to date. In addition, 3 mol% and 2 mol% CuZnO NPs have shown potential antimicrobial activity against Bacillus and Pseudomonas respectively. The possible mechanism for both photocatalytic activity and antimicrobial activity is demonstrated. Furthermore, 5 mol% CuZnO has shown the largest transient photocurrent of 1.147 mA/cm^2, which is ~12 times larger than undoped ZnO (0.096 mA/cm^2) due to the band-gap narrowing, suggests the possibility of photoelectrochemical sensors.

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Malabar Spinach (*Basella alba*), an Exotic Wonder Herb: A Review of Biomedical Applications

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SUMMARY. ***Basella alba*** **Linn. is an exotic herbaceous and medicinal plant distributed across South Asian and Tropical African countries. It is a perennial vine native to India, China, Bangladesh and Nepal. It is one of the important leafy vegetables utilized as a part of cuisine across India. It is packed with Vitamin A, Vitamin C and Iron. Owing to its high concentration of phenolic phytochemicals and flavonoid content in *B. alba,* it exhibits antioxidant properties that potentially make it an effective anti-cancerous drug. The herb, because of its ability to manage oxidative stress, can be a promising agent for treating diabetes mellitus. Also, several studies suggest that the herb is having anti-angiogenic and antiatherosclorotic properties. Hence, the herb can be a good choice to prevent and treat the related diseases and disorders. The plant extract also known to show insecticidal and antihelminthic activity. Apart from these, the fruit extract can also be used as natural colorant in food formulations like ice creams. Several such studies are underway to isolate and understand the properties of various compounds present in *B. alba.* Although the advantages of the herb are forestretched, the house-hold utility of it remains to be learnt, especially in urban areas. Hence, the present paper reviews some of the multi-facetted benefits that have been explored for this wonderful herb. This, consequentially, would help in promoting its effective utilization in the betterment of health and wellbeing.**

RESUMEN. *Basella alba* Linn. es una planta herbácea y medicinal exótica distribuida en los países del sur de Asia y África tropical. Es una enredadera perenne originaria de India, China, Bangladesh y Nepal. Es una de las verduras de hoja importantes que se utiliza como parte de la cocina en toda la India. Está repleta de vitamina A, vitamina C y hierro. Debido a su alta concentración de fitoquímicos fenólicos y contenido de flavonoides, *B. alba* exhibe propiedades antioxidantes que potencialmente lo convierten en un fármaco anticancerígeno eficaz. La hierba, debido a su capacidad para controlar el estrés oxidativo, puede ser un agente prometedor para el tratamiento de la diabetes mellitus. Además, varios estudios sugieren que la hierba tiene propiedades antiangiogénicas y antiateroscloróticas. Por lo tanto, la hierba puede ser una buena opción para prevenir y tratar las enfermedades y trastornos relacionados. El extracto de la planta también se sabe que muestra actividad insecticida y antihelmíntica. Aparte de estos, el extracto de fruta también se puede utilizar como colorante natural en formulaciones de alimentos como helados. Se están realizando varios estudios de este tipo para aislar y comprender las propiedades de varios compuestos presentes en *B. alba*. Si bien las ventajas de la hierba se desconocen, queda por conocer su utilidad doméstica, especialmente en las zonas urbanas. Por lo tanto, el presente documento revisa algunos de los beneficios multifacéticos que se han explorado para esta maravillosa hierba. Esto, en consecuencia, ayudaría a promover su utilización efectiva en el mejoramiento de la salud y el bienestar.

KEY WORDS: anticancer, anti-inflammatory, antimicrobial, antioxidant, *Basella alba* L.

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Influence of Hot Forging and Heat Treatment on Mechanical Properties of D-Series Cutting Tools

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Abstract

In this experimental work D2 and D3 type cutting tool samples have hot forged and heat treated. The belt a drop hammer of weight 500N was employed to press forge the selected steel tool materials. In the forging operation the materials were heated to 1100°C-1200°C. The structures of hot forged and heat treated tool samples were observed through metallurgical microscope. The hardness and impact strength of the tool materials were studied using Vickers micro hardness tester and Charpy impact testing machine. The wear resistance of the tool materials was assessed using pin on disc wear tester at constant sliding speed (1.675m/s) and sliding distance (1005m) at room temperature condition. The hardness, impact strength and wear resistance of the 20% forged and heat treated D2 tool and D3 tool materials were found comparatively better and the same was discussed under the background of microstructural changes.

Keywords: D2 and D3 steel tool; forging; heat treatment; hardness; impact strength; wear resistance; micostructure.

1. Introduction

Cutting tool materials must be harder than the materials which need machining and tool must withstand high frictional heat during metal-cutting process. A cutting tool must have desirable strength, hardness, wear resistance and toughness properties. Further the properties of cutting tools can be enhanced by forging. Modern manufacturers use either a powered hammer or dies to achieve mass production and complex shapes for the cutting tools [1].

The forged tools heat treatment further enhances the property value and make them more advantageous. Heat treatment process especially enhances grain structure, hardness, toughness, wear resistance and tool life as well. A steel material which is possessing balanced toughness and hardness can be justified the manufacturer demand.

The ageing at 800°C for 2 hours improves the tensile ductility, reduces the dislocation density and the stress concentration. The austenitized and tempered AISI D3 tool steel exhibits refined structure and thus hardness and wear resistance of new modified tool are equal to or even better than that of standard wrought D3 steel [2]. The heat treatment greatly influences the microstructure and abrasive wear resistance of AISI D2 steel. The volumetric abrasive wear found as increased with increasing tempering temperature and test conditions range [3].

The AISI D2 tool steels subjected to cold work showed a flat surface fracture. The SEM images showed dimple-like structures as a indication of ductile fracture [4]. The microstructure evolution and mechanical properties of D2 tool during annealing

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Studies on Effective Usage of SAP ERP Tool to Control Materials Planned Delivery Time in Oil and Gas Industries

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Abstract

The global competitions are making rapid changes in production. Procedure integration and seamless flow of information and data play a vital role in productivity. The planning order improbability, manufacturing lead time and lack of systematic approach are the main concerns in production industries. Enterprise Resource Planning (ERP) and Lean Manufacturing (LM) are the two distinct processes to deal with the above mentioned concerns for competitive manufacturing. ERP focuses on data and schedule accuracy and ensures repeatable and predictable processes. LM concentrates on identifying and eradicating or minimizing all kinds of manufacturing wastes and focuses on reducing process inconsistency. The paper narrates about some holistic approaches that can be practiced with SAP ERP tool in order to achieve the efficient materials planning, master production schedule and capacity planning.

Keywords: SAP ERP Tool, Planned Delivery Time, materials planning, master production schedule and capacity planning

1.0 Introduction

In the competitive world, organizations put themselves into an introspection of overall improvements of the industrial practices. Organizations realized that the requirement of the integration of the data and reports reduces the shortfalls of manufacturing efficiency and also production planning schedule. ERP implementation process can in fact perform as a mechanism for lean implementation [1].

The 'System Application Products' abbreviated as SAP is an extensively employed ERP application. An organization's operation control, management control and all types of resource planning can be improved using ERP software. The functional departments of an organization like quality control, inventory control, product marketing, plant maintenance, human resource, materials purchase can be aligned and made to work with proper coordination using multi-module SAP software application. Many additional functions can be integrated using SAP software application [2-3].

The 'System Application Products' (SAP) popularly called as SAP is a broadly used and established ERP application. SAP utilizes ERP software applications to enhance the performance the current competitive world of the ERP tools SAP has emerged as robust tool in order to achieve the organization demands. SAP tool is one of the most broadly accepted options to accomplish a competitive advantage for manufacturing companies. SAP systems are planned to provide seamless integration of processes across functional areas with enhanced workflow, standardization of different business practices, and right to use the real-time data. In fact the elemental advantages of ERP systems do not come from their

INFLUENCE OF CRYOGENIC TREATMENT ON TUNGSTEN CARBIDE CUTTING TOOL INSERTS IN IMPROVING RESISTANCE TO FLANK WEAR IN MACHINING C-45 STEEL

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Abstract: Machining has proven its capabilities in producing components with reasonable levels of dimensional accuracy, surface finish & surface integrity. To machine new class of materials, tungsten carbide is used, that has capabilities of producing good surface finish and allows faster machining rates. But in machining high temperature resistance and high strength alloys they have failed due rapid wear with loss of tool life. cryogenic treatment is one promising technology employed to improve tool life, wherein a tool insert when treated below a temperatures of -150 °C, leads to considerable improvement in hardness & wear resistance. Present investigation involves subjecting untreated tungsten carbide tool to cryogenic treatment cycle wherein initially the inserts were subjected to cryogenic treatment from room temperature to -193 °C, and then steadily reverted back to ambient temperature. To relieve the residual stresses formed during cryogenic treatment, inserts were subjected to low temperature tempering cycle at 250 °C and 300 °C, subsequently cooled in air and furnace. Cryotreated and tempered inserts demonstrated increase in hardness and inserts tempered at 300 °C and furnace cooled showed significant increase in hardness. Tool life tests demonstrated improved flank wear resistance in all treated inserts