ACHIEVEMENTS OF FACULTY MEMBERS

1.NUMBER OF RESEARCH PAPERS PUBLISHED IN JOURNAL (2022-2023)

S. No	Year	Name of the Faculty Member	Department	Title of the Research papers	Name of the Journal	Month & Year	Vol. & Issue No.	P.No.	ISSN. No.	Impact Factor	UGC / Scopus
1.	2022-2023	K. Selvam, T. Selvankumar	Biotechnology	Green chemistry approach for silver nanoparticles synthesis from *Halimeda macroloba* and their potential medical and environmental applications	Applied Nanoscience	April, 2023	13	5865–5875	2190-5509		Scopus
2.	2022-2023	T. Selvankumar	Biotechnology	Synergistic role of metal oxide loading cocatalysts on photocatalytic degradation of organic pollutants and inactive bacteria over template-free ZnFe2O4	Environmental Research	April, 2023	223	115459	1096-0953	7.7	Scopus, SCIE

				nanocubes							
3.	2022-2023	T. Selvankumar	Biotechnology	Development of ZnO/SnO2/rGO hybrid nanocomposites for effective photocatalytic degradation of toxic dye pollutants from aquatic ecosystems	Environmental Research	March, 2023	225	115602	1096-0953	7.7	Scopus, SCIE
4.	2022-2023	Thangaswamy Selvankumar	Biotechnology	Biogenic Preparation and Characterization of Silver Nanoparticles from Seed Kernel of Mangifera indica and Their Antibacterial Potential against Shigella spp.	Molecules	March, 2023	28 & 6	2468	1420-3049	4.6	Scopus, SCIE
5.	2022-2023	Thangaswamy Selvankumar	Biotechnology	Biotransformation as a tool for remediation of polycyclic aromatic hydrocarbons from polluted environment - review on toxicity and treatment technologies	Environmental Pollution	February, 2023	318	120923	1873-6424	7.3	Scopus, SCIE

6.	2022-2023	T. Selvankumar	Biotechnology	Docking of potentially bioactive compounds from Schefflera stellata (Geartn.) Baill against Epidermal Growth Factor Receptor in Lung cancer	Research Journal of Chemistry and Environment	November, 2022	26 (12)	57-67	0972-0626		Scopus
7.	2022-2023	Selvankumar Thangasamy	Biotechnology	Embedding green synthesized zinc oxide nanoparticles in cotton fabrics and assessment of their antibacterial wound healing and cytotoxic properties: An eco-friendly approach	Green Processing and Synthesis	September, 2022	11 (1)	875-885	2191-9550		Scopus, SCIE
8.	2022-2023	Selvankumar Thangasamy	Biotechnology	Bioactive Compounds of Schefflera stellata (Geartn.) Baill. Leaf Methanolic Extract and their Cytotoxic Effect on Lung cancer Cell Line (A549)	Indian Journal of Pharmaceutical Education and Research	September, 2022	56 (3)	S469-S478	0019-5464		Scopus

9.	2022-2023	Selvankumar Thangasamy	Biotechnology	Green Synthesis–Mediated Nanoparticles and Their Curative Character Against Post COVID-19 Skin Diseases	Current Pharmacology Reports	September, 2022	8 (6)	409-417	2198-641X	2.2	Scopus
10.	2022-2023	C. Sudhakar	Biotechnology	Sodium hydroxide pre-treated Aspergillus flavus biomass for the removal of reactive black 5 and its toxicity evaluation	Environmental Research	November, 2022	214	113859	1096-0953	7.7	Scopus, SCIE
11.	2022-2023	R Yuvarajan	Biotechnology	Larvicidal Efficacy and Characterization of Silver Nanoparticles Derived from Aqueous Leaves Extracts of Trichosanthes tricuspidata against Dengue Vector Ades aegypti	Indian Journal of Science and Technology	March-23	16 (38)	3258-3266	0974-5645		UGC
12.	2022-	Dr.A.Jayakumar	Tamil	Sanga Kala	Arima Nokku	July - 2022	16:2	41	2320-4842		Yes

	2023			Adaithozhil							
13.	2022-2023	Mrs. R. Sridevi	English	Feminism and Theatre in Alice Childress's Trouble in Mind	Aadhunik Sahitya	Oct-Dec/2022	44	162	2277-7083	-	UGC
14.	2022-2023	Dr.K. Kannadasan	English	Struggle and success of women in Rohinton Mistry's novel A Fine Balance/247	Aadhunik Sahitya	Jan-Mar/2023	45	247	2277-7083	-	UGC
15.	2022-2023	Dr. R.Indhumathi	Computer Science and Applications	Design of Task Scheduling and Fault Tolerance Mechanism Based on GWO Algorithm for Attaining Better QoS in Cloud System	Wireless Personal Communications	OCT-2022	128	2811-2829	0929-6212	2.0	Yes(Springer)
16.	2022-2023	Dr.M.Sankar	BBA	Impact of industrial relations on the performance of employees	Indian Journal of Natural Sciences,	2022	III & 75	5064 6-50651	0976-0997		Web of Science
17.	2022-2023	Dr. B. Jayalakshmi	BBA	Impact of industrial relations on the performance of employees	Indian Journal of Natural Sciences,	2022	III & 75	5064 6-50651	0976-0997		Web of Science

Applied Nanoscience
https://doi.org/10.1007/s13204-023-02812-7

ORIGINAL ARTICLE

Green chemistry approach for silver nanoparticles synthesis from *Halimeda macroloba* and their potential medical and environmental applications

G. Lavanya[1] · K. Anandaraj[1] · M. Gopu[2] · K. Selvam[2] · T. Selvankumar[2] · M. Govarthanan[3,4] · P. Kumar[5]

Received: 8 November 2022 / Accepted: 27 February 2023

Abstract

This study aims to synthesize silver nanoparticles (AgNPs) using *Halimeda macroloba* extract and assess their anticancer and photocatalytic properties. Ultraviolet–visible spectrophotometry (UV–visible), Fourier transform infrared (FT-IR) spectroscopy, Transmission electron microscope (TEM), scanning electron microscope-energy-dispersive spectroscopy (SEM–EDX), X-ray photoelectron spectroscopy (XPS), and particle-size distribution (PSD) were used to characterize the synthesized AgNPs. The green-synthesized AgNPs to be spherical in shape with a size of about 50–100 nm. The half-maximal inhibitory concentration (IC_{50}) for AgNPs was determined to be 89.5 g/mL against the human hepatoma cell line (Huh-7). Fluorescent microscopy was used to evaluate the morphological alterations of Huh-7 cells stained with acridine orange/ethidium bromide (AO/EtBr), 2′-7′dichlorofluorescin diacetate (DCFH-DA), and rhodamine 123. Meanwhile, AgNPs exhibited 91.35% photocatalytic activity against methylene blue (MB) after 100 min of exposure to sunlight. Therefore, AgNPs have a strong potential for usage in anticancer activities and photocatalytic organic pollutant destruction.

Keywords Green seaweeds · *Halimeda macroloba* · Silver nanoparticles · Anticancer activity · Photocatalytic activity

Introduction

In decades past, nanotechnology was indeed a notable branch of contemporary research dealing with the manipulation, synthesis, and design of particles with 1–100 nm dimensions. Nanoparticles (NPs) are characterized by their small size and increased surface area, and they are utilized in numerous industries, including cosmetics, food industries, environmental bioremediation, optics, electrical, textile, catalysts, light emitters, photocatalytic, biosensors, energy research, drug delivery, and biological sciences (Ashraf et al. 2019; Behzad et al. 2021; Paiva-Santos et al. 2021; Sana et al. 2021; Wang et al. 2021; de Jesus et al. 2021; Seitkalieva et al. 2021; Dawood et al. 2022; Hojjati-Najafabadi et al. 2022). The various types of noble metal nanoparticles, including copper, zinc, titanium, magnesium, nickel, iron, silver, and gold. Among them, silver NPs are widely used in the sectors of cosmetics, nanomedicine, photocatalytic, food processing, biomedical imaging, antibacterial activities, and more due to their unusual stability, conductivity, and targeted medication delivery (Aravinthan et al. 2015; Chinnappan et al. 2018; Balakrishnan et al. 2020; Gopu et al.

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Published online: 12 April 2023

Environmental Research 223 (2023) 115459

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Synergistic role of metal oxide loading cocatalysts on photocatalytic degradation of organic pollutants and inactive bacteria over template-free $ZnFe_2O_4$ nanocubes

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ARTICLE INFO

Keywords:
$ZnFe_2O_4$ nanoparticles
Ag_2O_x
Reactive red 120
Rhodamine B
Photocatalyst

ABSTRACT

For wastewater treatment, a highly reliable and ecologically friendly oxidation method is always preferred. This work described the production of a new extremely effective visible light-driven Ag_2O_x loaded $ZnFe_2O_4$ nanocomposties photocatalyst using a wet impregnation technique. Under visible light irradiation, the produced Ag_2O_x loaded $ZnFe_2O_4$ nanocomposties were used in the photodegradation of rhodamine B (RhB) and Reactive Red 120 (RR120) dyes. Analysis using X-ray diffraction, Fourier transform infrared spectroscopy, X-ray photoelectron spectroscopy, and transmission electron microscopy revealed that Ag_2O_x nanoparticles were well dispersed on the surface of $ZnFe_2O_4$ NPs and that the Ag_2O_x loaded $ZnFe_2O_4$ NPs were created. When compared with bare $ZnFe_2O_4$ NPs, Ag_2O_x-loaded $ZnFe_2O_4$ nanocomposites showed better photocatalytic activity for RhB and RR120 degradation under visible light (>420 nm) illumination. The reaction kinetics and degradation methodology, in addition to the photocatalytic degradation functions of Ag_2O_x-loaded $ZnFe_2O_4$ nanocomposites, were thoroughly investigated. The 3 wt% Ag_2O_x loaded $ZnFe_2O_4$ nanocomposites have a 99% removal efficiency for RhB and RR120, which is about 2.4 times greater than the $ZnFe_2O_4$ NPs and simple combination of 1 wt% and 2 wt% Ag_2O_x loaded $ZnFe_2O_4$ nanocomposites. Furthermore, the 3 wt% Ag_2O_x loaded $ZnFe_2O_4$ nanocomposites demonstrated consistent performance without decreasing activity throughout 3 consecutive cycles, indicating a potential approach for the photo-oxidative destruction of organic pollutants as well as outstanding antibacterial capabilities. According to the findings of the experiments, produced new nanoparticles are an environmentally friendly, cost-efficient option for removing dyes, and they were successful in suppressing the development of Gram-negative and Gram-positive bacteria.

1. Introduction

The importance of environmental and ecological challenges has heightened interest in solar energy consumption. Excessive pollution of water sources might pose a serious hazard to both humans and other organisms. Synthetic dyes are regarded as among the most significant contaminants entering the environment by the garment, printing, agricultural, and fabric industries (Kishor et al., 2021). However a major portion of such synthetic materials are non-toxic or less harmful, their existence in the water raises oxygen demand, affecting aquatic animals (Lellis et al., 2019). As perhaps the most viable and emerging approaches, metal oxide semiconductors continue to be a topic of significant findings. They can remove organic effluents, particularly dyes, into simple, non-hazardous CO_2 and H_2O under aqueous conditions and recognize an emerging environmental risk (Li et al., 2022; Al-Tohamy et al., 2022). Semiconductor-based materials among many other WO_3, SnO_2, CeO_2, and NiO are often used during photocatalytic processes (Nisa et al., 2022; Hango et al., 2023; You et al., 2020; Manikandan and Lee, 2023).

Due to its advantageous, like as good stability, nontoxicity, low cost, and novel photoelectrochemical characteristics under light illumination, $ZnFe_2O_4$ as a particular performance oxide has gained the great interest

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https://doi.org/10.1016/j.envres.2023.115459
Received 11 January 2023; Received in revised form 5 February 2023; Accepted 8 February 2023
Available online 9 February 2023

Environmental Research 220 (2023) 115602

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Development of ZnO/SnO_2/rGO hybrid nanocomposites for effective photocatalytic degradation of toxic dye pollutants from aquatic ecosystems

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ARTICLE INFO

Keywords:
ZnO SnO_2 rGO
Ternary nanocomposite
Photocatalysis
Dye degradation

ABSTRACT

The impact of ZnO/SnO_2/reduced graphene oxide nanocomposites (ZnO/SnO_2/rGO NCs) for improved photocatalytic degradation of organic dye pollution is examined in this study. The developed ternary nanocomposites had a variety of characteristics that were detected, such as crystallinity, recombination of photogenerated charge carriers, energy gap, and surface morphologies. When rGO was added to the mixture, the optical band gap energy of ZnO/SnO_2 was lowered, which improved the photocatalytic activity. Additionally, in comparison to ZnO, ZnO/rGO, SnO_2/rGO samples, the ZnO/SnO_2/rGO nanocomposites demonstrated exceptional photocatalytic effectiveness for the destruction of orange II (99.8%) and reactive red 120 dye (97.02%), respectively after 120 min exposure to sunlight. The high electron transport properties of the rGO layers, which make it feasible to efficiently separate electron-hole pairs, are attributed to the enhanced photocatalytic activity of the ZnO/SnO_2/rGO nanocomposites. According to the results, synthesized ZnO/SnO_2/rGO nanocomposites are a cost-efficient option for removing dye pollutants from an aqueous ecosystem. Studies show that ZnO/SnO_2/rGO nanocomposites are effective photocatalysts and may one day serve as the ideal material to reduce water pollution.

1. Introduction

As a result of population growth, water pollution and a lack of fresh water have recently become major issues. Untreated home, industrial, and agricultural wastewater discharges into major waterways have a negative impact on biological systems and have an impact on groundwater through surface waters (Begum et al., 2018; Achary et al., 2020). Then, Inorganic, and organic wastewater and antibiotics are the main causes of water pollution. These substances worry scientists because of their good stability (Zhou et al., 2019; Xie et al., 2019). Among the major ecological steps that have to be taken to stop the pollution of resources is the removal of organic dyes from aquatic settings. Because it is a straightforward, inexpensive, and eco-friendly method of water purification, photocatalytic activity has generated a lot of attention. It may eliminate or reduce the harmful effects of toxic pollutants and hazardous waste in aquatic settings (Zhang et al., 2020; Yu et al., 2019). Among these, organic pollution is a serious global environmental issue. The fact that there are more manufacturers producing things like rubber, textiles, and printing causes organic pollution (Khan et al., 2022).

The utilization of photocatalytic and adsorption processes has recently been employed to discover a solution to this issue (Ma et al., 2020). The photocatalytic activity of several substances has so far been studied, including metal-organic frameworks, perovskites, semiconductor sulfides, and oxides. The use of different semiconductor materials for cleaning up organic pollutants has increased recently. ZnO (Ragupathy et al., 2022), CdO (Warshagha and Muneer, 2022), SnO_2 (Ren et al., 2022), Fe_2O_3 (Wang et al., 2023a), CuO (Asseh Kassegn Sibhatu et al., 2022), WO_3 (Wang et al., 2023b), TiO_2 (You et al., 2022), and V_2O_5 (Le et al., 2022) are some of the metal oxide-based semiconductors that have been utilized as photocatalysts to remove toxic dye

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https://doi.org/10.1016/j.envres.2023.115602
Received 24 January 2023; Received in revised form 17 February 2023; Accepted 28 February 2023
Available online 1 March 2023
0013-9351/

molecules

MDPI

Article

Biogenic Preparation and Characterization of Silver Nanoparticles from Seed Kernel of *Mangifera indica* and Their Antibacterial Potential against *Shigella* spp.

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Citation: Angamuthu, S.; Thangaswamy, S.; Raju, A.; Husain, F.M.; Ahmed, B.; Al-Shabib, N.A.; Hakeem, M.J.; Shahzad, S.A.; Abudujayn, S.A.; Alomar, S.Y. Biogenic Preparation and Characterization of Silver Nanoparticles from Seed Kernel of *Mangifera indica* and Their Antibacterial Potential against *Shigella* spp. *Molecules* **2023**, *28*, 2468. https://doi.org/10.3390/molecules28062468

Academic Editors: Borislav Angelov and Vasyl M. Haramus

Received: 4 October 2022
Revised: 2 March 2023
Accepted: 4 March 2023
Published: 8 March 2023

Abstract: Shigellosis is a serious foodborne diarrheal disease caused by the *Shigella* species. It is a critical global health issue. In developing countries, shigellosis causes most of the mortality in children below 5 years of age. Globally, around 165 million cases of diarrhea caused by *Shigella* are reported, which accounts for almost 1 million deaths, in which the majority are recorded in Third World nations. In this study, silver nanoparticles were synthesized using *Mangifera indica* kernel (MK-AgNPs) seed extracts. The biosynthesized *M. indica* silver nanoparticles (MK-AgNPs) were characterized using an array of spectroscopic and microscopic tools, such as UV–Vis, scanning electron microscopy, particle size analyzer, Fourier transform infrared spectroscopy, and X-ray diffractometer. The nanoparticles were spherical in shape and the average size was found to be 42.7 nm. The MK-AgNPs exhibited remarkable antibacterial activity against antibiotic-resistant clinical *Shigella* sp. The minimum inhibitory concentration (MIC) value of the MK-AgNPs was found to be 20 µg/mL against the multi-drug-resistant strain *Shigella flexneri*. The results clearly demonstrate that MK-AgNPs prepared using *M. indica* kernel seed extract exhibited significant bactericidal action against pathogenic *Shigella* species. The biosynthesized nanoparticles from mango kernel could possibly prove therapeutically useful and effective in combating the threat of shigellosis after careful investigation of its toxicity and in vivo efficacy.

Keywords: AgNPs; drug resistance; enteric pathogen; shigellosis; spectral analysis

1. Introduction

Shigellosis is a diarrheal disease caused by the *Shigella* species and is a serious health concern globally. Mortality is high in children below 5 years of age, particularly in developing countries [1]. Furthermore, around 165 million cases of diarrhea were reported across the globe, causing approximately one million deaths annually, most of which were recorded in Third World countries [1]. Shigellosis is a burden on middle-income and low-income countries where clean drinking water, proper nutrition, sustained sanitation, and healthcare facilities are limited. Although all age groups are susceptible to *Shigella* infection, it is endemic in children below 5 years of age [2].

Environmental Pollution 318 (2023) 120923

Contents lists available at ScienceDirect

Environmental Pollution

journal homepage: www.elsevier.com/locate/envpol

Biotransformation as a tool for remediation of polycyclic aromatic hydrocarbons from polluted environment - review on toxicity and treatment technologies☆

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ARTICLE INFO

Keywords:
Bioremediation
Phenanthrene
Naphthalene
Bioreactors
Toxicity

ABSTRACT

Polycyclic aromatic hydrocarbons, a prominent family of persistent organic molecules produced by both anthropogenic and natural processes, are widespread in terrestrial and aquatic environments owing to their hydrophobicity, electrochemical stability and low aqueous solubility. Phenanthrene and naphthalene belong to the group of polycyclic aromatic hydrocarbons whose occurrence are reported to be relatively higher. The bioremediation mode of removing the toxicities of these two compounds has been reported to be promising than other methods. Most of the microbial classes of bacterial, fungal and algal origin are reported to degrade the target pollutants into non-toxic compounds effectively. The review aims to give an overview on toxicological studies, identification and enrichment techniques of phenanthrene and naphthalene degrading microbes and the bioremediation technologies (microbial assisted reactors, microbial fuel cells and microbial assisted constructed wetlands) reported by various researchers. All the three modes of bioremediation techniques were proved to be promising on different perspectives. In the treatment of phenanthrene, a maximum recovery of 96% and 98% was achieved in an aerobic membrane reactor with *Bacillus* species and single chamber air cathode microbial fuel cell with *Acidovorax* and *Aquamicrobium* respectively were reported. With the constructed wetland configuration, 95.5% of removal was attained with manganese oxide based microbial constructed wetland. The maximum degradation efficiency reported for naphthalene are 99% in a reverse membrane bioreactor, 98.5% in a marine sediment microbial fuel cell and 92.8% with a low-cost sandy soil constructed wetland.

1. Introduction

Environmental degradation is a serious negative outcome of swelling urbanization that largely hinders the ecological balance and sustainable development. Of major environmental pollutants, polycyclic aromatic hydrocarbons (PAHs) are considered as unrelenting contaminants with a broad spectrum of toxicities. Unlike many other pollutants, PAHs are discharged not only by anthropogenic activities, but also through natural emission. Oil refinery, coal mines, distilleries, tannery, cement, asphalt, dye, power generation, etc. are some of the instances of industrial source of PAHs, whereas volcanic eruptions and forest fires are the natural contributors (Sharma, 2022). Phenanthrene and naphthalene are simpler non-polar PAH compounds with two or three benzene rings in their structure. The diverse occurrence of these compounds in different regions pose a great challenge in identification and separation. However, its mobilization is limited as it doesn't get dissolved in water bodies (Akash et al., 2022c). The exposure of PAHs contributes severe toxicity to living species due to the hazardous chemical properties. In humans, the exposure of PAHs is caused by constant burning of coal and fossil fuels. The PAHs' exposure imposes acute toxicity, lung cancer and leukemia in humans. The unusual concentration of PAHs in soil affects the life cycle of plants and microorganisms. Three categories of soil PAHs pollution has been reported based on their concentration level in soil. Occurrence less than 200 ng/g is regarded as unpolluted whereas concentration levels in the range of 200–600 ng/g and greater than 600 ng/g are weakly polluted and heavily polluted respectively (Wu et al.,

☆ This paper has been recommended for acceptance by Govarthanan Muthusamy.

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https://doi.org/10.1016/j.envpol.2022.120923
Received 11 August 2022; Received in revised form 11 November 2022; Accepted 20 December 2022
Available online 23 December 2022

Docking of potentially bioactive compounds from *Schefflera stellata* (Geartn.) Baill against Epidermal Growth Factor Receptor in Lung cancer

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Abstract

Receptor tyrosine kinase is a large transmembrane protein family that is often deregulated to cause lung cancer. EGFR is a cell membrane receptor that is over-expressed in lung cancer with numerous active mutated genes. Pharmacologically active compounds were purified from methanolic leaf extract of Schefflera stellata (Geartn.) Baill. which shows the potent inhibitory effect on over-expressed EGFRs. FTIR analysis D4 and D5 shows the presence of different functional groups such as carboxylic acids, phenol, amines, alcohols, alkanes, alkenes, aromatics, alkyl halides, esters, aromatic amines, ethers, aliphatic amines, saturated aliphatic compounds with 14 major characteristics peaks of bioactive components.

Docking studies were carried out between the EGFR tyrosine kinase and purified bioactive compounds (D4 and D5). Totally 5 bioactive molecules were docked with both wild and mutated EGFR. The 3 ligand molecules were picked out based on their binding energy. Among 3 bioactive molecules 1, 2-benzene dicarboxylic acid, mono (2-Ethylhexyl) ester (CID 20393) was found to be most effective that inhibiting over-expressed EGFR tyrosine kinase. The results confirmed that the purified bioactive compounds of Schefflera stellata (Geartn.) Baill. methanolic leaf extract possessed different bioactive functional constituents and its inhibitory role in binding with the D5 compound in over-expressed EGFR in lung cancer cells using docking studies.

Keywords: *Schefflera stellata*, EGFR, FTIR, Docking, Bioactive compounds.

Introduction

Plant based medicines create more attention in recent years compared to synthetic medicines due to their dreadful consequences. Medicinal plants with their refined bioactive constituents have proven favorable therapeutic applications with lower risks. The plant contains a wide range of phytochemicals for the defense mechanism to exhibit medicinal properties. Cancer ranks as a major reason for death worldwide. Cancer is a lethal disease that causes abnormal cellular functions that are passed on to the offspring. WHO in 2019 estimated cancer as the first or second leading cause of death before the age of 70 years in 112 out of 183 countries and ranked third or fourth in further 23 countries. In 2020, WHO estimated 2.2 million new cancer cases and 1.8 million deaths; lung cancer is the second most common and the leading cause of cancer death in 2020, constituting approximately 1 in 10 (11.4%) cancers detected and 1 in 5 (18.0%) deaths[7].

Lung cancer is commonly divided into two types, small cell and non-small cell lung cancer cells. The non-small cell lung cancer cell (NSCLC) is sub grouped as adenocarcinoma (30–40%), squamous cell carcinoma (30%) and large cell carcinoma (10%) and in small cell lung cancer (SCLC) (20%), cancer cell rapidly proliferate to other parts of the diagnosis and are also found in carcinoid and lymphoma (5%). The development of a therapeutic approach to lung cancer is one of the most challenging areas in cancer research. Bioactive plant compounds have been recognized as a class of promising anticancer agents[12]. NSCLC shows the vast majority of lung cancer patients with approximately 85% and commonly diagnosed at an advanced stage with a low prognosis[13]. Receptor tyrosine kinase (RTK) is the most deregulated protein family in lung cancer[4].

Receptor tyrosine kinase is involved in the signal transduction pathway that regulates overall cellular and metabolic processes including cell proliferation, growth, differentiation, migration and cell-to-cell communications which took over the functional activities of RTKs. The over expression of RTKs developed from mutations and gene rearrangement associated with tumor growth and progression. Epidermal growth factor receptor (EGFR) is the foremost identified receptor of tyrosine kinases which is vital for the biological functions of the cell. EGFR is over-expressed in numerous solid tumors such as GI tract, prostate, NSCL, breast, ovarian and glioblastoma[14].

Schefflera is the wide geographically extensive genus in the Araliaceae with 400 to 650-700 species found in most tropical and subtropical regions but for the most part in Southeast Asia, Madagascar, New Caledonia, the Andes and

Research Article

Nivedhitha Kabeerdass, Selvankumar Thangasamy, Karthikeyan Murugesan, Natarajan Arumugam, Abdulrahman I. Almansour, Raju Suresh Kumar, Plalanivel Velmurugan, Selvaraj Vijayanand, Thajuddin Nooruddin, Vinayagam Mohanavel, Subpiramaniyam Sivakumar*, and Maghimaa Mathanmohun*

Embedding green synthesized zinc oxide nanoparticles in cotton fabrics and assessment of their antibacterial wound healing and cytotoxic properties: An eco-friendly approach

https://doi.org/10.1515/gps-2022-0072
received January 04, 2022; accepted June 14, 2022

Abstract: This study explores the potential of the natural and cost-effective method of wound healing using *Alternanthera sessilis* by an *in vitro* study (using fibroblast L929 cells). Gram-positive bacteria *Staphylococcus aureus* shows a zone of inhibition of 20 mm at 60 µg concentration in the antibiogram profile against the zinc oxide nanoparticles (ZnONPs) wetted in fabrics synthesized from the Amaranthaceae family. Through characterization studies of the AS-ZnONPs, it was found that UV–visible spectra show a peak in the range of 350–460 nm, Fourier transform infrared spectroscopy spectra show a correlation peak in the range of 340–4,500 cm^{-1}, scanning electron microscope with electron diffraction analysis results in a peak in the range of 7.8–9.4, and high-resolution transmission electron microscope, which exposes the morphological character (diamond shape in a black and white background), shows a peak at 200 nm. This work shows that the leaf extract of *A. sessilis* might support the ancient method of wound healing.

Keywords: *Alternanthera sessilis*, ZnONPs, antimicrobial fabrics, wound healing

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Abbreviations

FT-IR	Fourier transform infrared spectroscopy
HR-TEM	high-resolution transmission electron microscope
MDR	multidrug resistant
MHA	Muller–Hinton agar
MRSA	methicillin resistant *Staphylococcus aureus*
MTT	yellow tetrazolium salt (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide)
SEM with EDX	scanning electron microscope with electron diffraction analysis
UV-Vis	UV-visible
XDR	extreme drug resistant

Original Article

Bioactive Compounds of *Schefflera stellata* (Geartn.) Baill. Leaf Methanolic Extract and their Cytotoxic Effect on Lung cancer Cell Line (A549)

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ABSTRACT

Objectives: The present study was focused on the fractionation and isolation of biologically active plant secondary metabolites from methanol leaf extract of *Schefflera stellata* (Geartn.) Baill. and their cytotoxic effect were evaluated by performing an MTT assay over the Lung cancer cell line (A549). **Materials and Methods:** Bioactive molecules were fractioned and purified using Column and TLC. Purified constituents exhibit its antioxidant property by dot plot assay using DPPH method. The cytotoxic activity of the purified compound was evaluated by MTT assay. **Results:** Extraction, isolation, seperation of bioactive molecules from methanol leaf extract of *Schefflera stellata* (Geartn.) Baill. Using silica column chromatography. 32 fractions were obtained in column and subjected to TLC and dot plot assay by DPPH method. Out of 32 fractions, 2 fractions (D4 and D5) revealed the presence of antioxidant property and were characterized by GC-MS. D5 exhibit bioactive compound, which were taken for cytotoxic studies against lung cancer cell line by MTT assay, the cell viability was found to decrease with increasing concentration (50, 100, 150, 200, 250 µg/ml) with an IC_{50} concentration of 150 µg/ml. **Conclusion:** The present study proves that the purified D5 compound of *S. stellata* (Geartn.) Baill. has the natural source of antioxidant, which possess the strong cytotoxic activity against lung cancer line (A549).

Key words: *Schefflera stellata*, GC-MS, Cytotoxic activity, Dot plot assay, DPPH, Lung Cancer.

Submission Date: 23-04-2021;
Revision Date: 05-11-2021;
Accepted Date: 18-03-2022.

DOI: 10.5530/ijper.56.3s.155

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INTRODUCTION

Cancer is abnormal cell growth, incursion of other tissues and dissemination to other sites in an unregulated way without regarding the body's need. In recent days, one in six people is dying due to cancer all over the world. The risk factors, that depends upon genetic constitutions, lifestyle and environmental conditions, such as food habits, exposure to carcinogenic chemicals. According to a WHO report, premature death by non-communicable disease is highest in India like cardiovascular, respiratory problems and Diabetics, cancer which is the vital public health concern.[1]

In India, non-communicable diseases were estimated at 63% of all deaths and cancer was one of the prime causes (9%). Among males Lung, mouth, oesophagus and stomach were most regular and in the female breast, cervix uteri are the most regular sites of cancer. One in 68 males is affected by lung cancer, which is one of the common cancer in the year 2020 for males.[2] Lung cancer is mainly because of cigarette smoking, exhibit to toxins or inhaled chemicals can rapidly increase the risk. Current treatments encompass chemotherapy, radiotherapy and synthetic drugs. Treatments such as chemotherapy can put sufferer under a lot

www.ijper.org

Current Pharmacology Reports (2022) 8:409–417
https://doi.org/10.1007/s40495-022-00303-x

NATUROPATHY, NANOTECHNOLOGY, NUTRACEUTICALS, AND IMMUNOTHERAPY IN CANCER RESEARCH (H LATHA, SECTION EDITORS)

Green Synthesis–Mediated Nanoparticles and Their Curative Character Against Post COVID-19 Skin Diseases

Nivedhitha Kabeerdass[1] · Selvankumar Thangaswamy[2] · Vaithilingam Mohanasrinivasan[3] · Chandrasekaran Rajasekaran[3] · Selvakumar Sundaram[4] · Thajuddin Nooruddin[5] · Maghimaa Mathanmohun[1]

Accepted: 18 August 2022 / Published online: 9 September 2022

Abstract

Purpose of Review This article provides the explanatory manuscript regarding the SARS-Corona virus 2. Sub-titled as the history of single-stranded RNA, internal characters of COVID-19, resource, the life cycle of COVID-19, reservoir of the disease, secondary infections of COVID-19 and nano herbal remedy.

Recent Findings The skin is not the main target of the SARS-corona virus 2 infections but somehow directly or indirectly, it causes exacerbating eruptions on the skin. Recent research shows that curcumin–mediated synthesized AgNPs show its potential character in the entry of respiratory syncytial virus (RSV), blocks interaction with the viral surface, and damages the viral protein. In modern days, molecular docking studies fabricated copper iodide flower extract (CuI-FE) which shows tough inhibitory action against COVID-19. Many articles show green synthesis–mediated nanoparticles like silver, gold, zinc, copper, iron, titanium dioxide, selenium, and cadmium which possess high anti-viricidal activity.

Summary The anti-oxidant, anti-viral, anti-inflammatory, anti-hive rich plant–mediated nanoparticle synthesis might be an alternative betterment, cost-effective, and eco-friendly medication for the skin disease caused by SARS-corona virus 2 (the viral clinical signs are itchy, hives, rashes, papules, psoriasis, and inflammation) and (non-viral clinical signs-pressure urticaria, contact dermatitis, and acne) that occurred as the result of COVID-19.

Keywords Pandemic · Cuticular · Phytotherapeutic · Coronavirus · Reservoir · Anti-hives

This article is part of the Topical Collection on *Naturopathy, Nanotechnology, Nutraceuticals, and Immunotherapy in Cancer Research*

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Introduction

The word virus is derived from the infectious fluid which is entitled "contagium vivum fluidum" by the inventors in 1930. A ubiquitous, pleomorphic, plasma membrane–wrapped surface with positive-sense RNA showing coronet texture, enclosing membrane proteins (M, E, N, and spiker) is known as coronavirus. In China, pneumonia patients isolated the severe acute respiratory syndrome coronavirus 2 which is a new zoonotic RNA virus and the causative agent of the coronavirus disease-19. The name was entitled by the public health international conference and WHO on February 11, 2020. This disease is menacing and prevailing throughout the world at a lurching speed [1••]. Genotypically, coronavirus is divided into four types of genera alpha, beta, delta, and gamma. This B.1.1.7 variant (alpha) was first documented in the UK, B.1.351 (beta) variant was documented in South Africa, P.1 variant (gamma) documented in Brazil, and B.1.617.2 (delta)

Environmental Research 214 (2022) 113859

Contents lists available at ScienceDirect

Environmental Research

journal homepage: www.elsevier.com/locate/envres

Sodium hydroxide pre-treated *Aspergillus flavus* biomass for the removal of reactive black 5 and its toxicity evaluation

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ARTICLE INFO

Keywords:
Aspergillus flavus
Reactive black 5
Pretreatment
Adsorption
Toxicity

ABSTRACT

The present study was focused on the removal of Reactive Black 5 (RB5) from aqueous solution using pre treated *Aspergillus flavus* as a biosorbent. Pre-treatment of fungal biomass with 0.1 M sodium hydroxide facilitated the removal of dye effectively when compared to untreated fungal biomass. Optimum biosorption conditions for RB5 removal was determined as a function of dye concentration (50–400 mg/L), biosorbent concentration (100–500 mg/L), incubation time (1–7hrs), pH (3–8) and temperature (20–50 °C). At the optimum conditions, the maximum removal efficiency of RB5 achieved by NaOH pretreated *A. flavus* was 91%. The dye removal was studied kinetically and it obeys the pseudo-second order model and the experimental equilibrium data well fitted the Langmuir isotherm indicating monolayer adsorption of dye molecules on the biosorbent. The thermodynamic parameters such as a change in free energy (ΔG), enthalpy (ΔH) and entropy (ΔS) were calculated and negative values of ΔG suggested that the dye removal process was spontaneous at all temperatures. Furthermore, the values of ΔH revealed that the adsorption process was endothermic. Recovery of RB5 from the fungal biomass was effective using 0.1 M Na_2CO_3 as an eluent. The interaction of adsorbate with biosorbent was analyzed using UV–Vis and FT-IR spectroscopy, SEM and XRD analyses. Phytotoxicity and microbial toxicity studies revealed the non-toxic nature of the treated dye solution. Hence, the fungal biomass pretreated with NaOH was efficient in decolorizing RB5 as well as composite raw industrial effluent generated from dyeing industries.

1. Introduction

Increasing industrialization and urbanization in human lifestyles have resulted in the contamination and deterioration of water quality and causes various health problems (Haseena et al., 2017). Rapid industrial revolution has provoked to employ synthetic dyes in the food, cosmetic, pharmaceutical, leather and textile industries which resulted in the release of over 1.5 million litres of wastewater into the aquatic ecosystem as effluents (Tripathi et al., 2019; Medha and Thakur, 2018; Shafqat et al., 2017; Wu et al., 2014). Amidst all, azo dye occupies the largest class comprising nearly 60–70% of all the dyeing materials produced annually. They are used commonly in the textile industry because of their high wet fastness, ease of application, brilliant colour and minimal energy consumption. Due to their complex structure and xenobiotic nature, they persist in the aquatic system and thereby difficult to remove (Bruschweiler and Merlot, 2017; Cao et al., 2017). The presence of synthetic dyes and toxic chemicals in aquatic ecosystem decreases the level of dissolved oxygen, interrupts the pH, diminishes the light penetration which thereby impedes the photosynthesis of aquatic flora and makes the water aesthetically objectionable for drinking (Nigam et al., 2016). Exposure to dyes directly causes skin allergy, dermatitis, provokes cancer and mutation in human beings (Elumalai and Saravanan, 2016; Li et al., 2017; Berber-Villamar et al., 2018; Pathak et al., 2014).

Reactive Black 5 (RB5) is a synthetic reactive azo dye that is extensively used in textile industries for dyeing fabrics. The extended use of RB5 may cause allergic reactions to the respiratory system and induce cancer in human beings. As a result, removing RB5 from wastewater in

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https://doi.org/10.1016/j.envres.2022.113859
Received 31 March 2022; Received in revised form 1 June 2022; Accepted 6 July 2022
Available online 14 July 2022

ISSN 2320-4842

சங்க கால ஆடைத்தொழில்

முனைவர் அ. ஜெயக்குமார்
உதவிப் பேராசிரியர், தமிழாய்வுத்துறை
மஹேந்ரா கலை அறிவியல் கல்லூரி, நாமக்கல் மாவட்டம் 637 501

சங்க காலத் தமிழர்கள் பலவிதமான ஆடைகள் அணிந்து மகிழ்ந்ததைச் சங்க இலக்கியங்கள் நமக்கு அறிவுறுத்துகின்றன. சங்க கால மக்களின் சூழலுக்கேற்ப அவர்கள் ஆடையும் மாறுபடுகிறது. பாம்பின் தோல் போன்ற ஆடை, பாலாவியைப் போன்ற ஆடை, பட்டாடை, பருத்தியாடை போன்ற பலவித ஆடை களைப் பற்றிச் சங்க இலக்கியம் கூறுகிறது. சங்க கால மக்களின் ஆடைத்தொழில் பற்றிய செய்திகளை இக்கட்டுரை இயம்புகிறது.

உண்ண உணவும், உடுக்க உடையும் இருக்க இருப்பிடமும் மனிதனின் அடிப்படைத் தேவைகளுள் முதன்மை பெறுகின்றன. காடுகளை வெட்டிக் கழனியாக்கி, பயிர்த்தொழில் செய்து மனிதன் தன் முதல் தேவையை நிறைவு செய்கிறான். மனிதன் உணவுத் தேவையை நிறைவு செய்தபின், உடையின் மீது அவன் எண்ணம் செல்கிறது. பல விதமான உடைகளை உருவாக்குகிறான். பலதொழில்களிலும் சிறந்து விளங்கிய தமிழர்கள் ஆடைத் தொழிலில் சிறந்து விளங்கினர்.

ஆடையுடன் தொடர்புடைய அனைத்துத் தொழில்களும் ஆடைத்தொழிலில் அடங்குகின்றன. 1. மூலப்பொருட் கள் சேகரித்தல், 2. மூலப்பொருட்களைத் தயார்ப்படுத்தல், 3. நூல் நூற்றல், 4. பாவு,. 5. நெய்தல், 6. மிளிரச் செய்தல், 7. மணமூட்டல், 8. தைத்தல், 9. வணிகம், 10. வெளுத்தல் போன்ற செயல்கள் அனைத்தும் ஆடைத்தொழிலில் அடங்குகின்றன. எல்லா வகை ஆடைகளுக்குமே மேற்குறிப்பிட்ட செயல்கள் அனைத்தும் பொருந்தாது. சங்கத்தமிழர் அனைவருமே அனைத்து ஆடைகளையும் பயன்படுத்தவில்லை. அவரவரின் நிலத்தில் கிடைக்கும் பொருட்கள், சூழல், பொருளாதாரம் இவற்றிற்கு ஏற்றாற்போல் ஆடை களை அணிந்தனர்.

1. மூலப்பொருட்கள்

ஆடை தயாரித்தலுக்கான சில இயற்கைப் பொருட்களைத் தாவரத்தில் இருந்தும், விலங்குகளிடம் இருந்தும் சங்கத்தமிழர் பெற்றுள்ளனர். தழை, மரப்பட்டை, பருத்தி போன்றவை தாவரத்தில் இருந்தும், தோல், பட்டு, மயிர் போன்றவை விலங்குகளிடம் இருந்தும் பெறப்பட்டுள்ளன.

தழையாடைகளும், மரப்பட்டை ஆடைகளும் காலப்போக்கில் குறைந்து நூலாடைகள் முதன்மை பெற்றன. தோலாடைகளும் காலப்போக்கில் குறைந்து, பட்டாடைகள் முதன்மை பெற்றன. தழையுடையைப் பெண் களும், மர நாருடையை ஆண்களும் அணிந்துள்ளனர்.

தழை, மரப்பட்டை போன்ற ஆடைகளின் குறைவாக உழைக்கும் திறனும், நீண்ட நாள் உழைக்கும் பிற வகை ஆடைகளின் காரணமாக இந்த ஆடைகளின் பயன்பாடு குறைந்திருக்கலாம். தோலாடைகளை சரி யான அளவில் உடுத்த முடியாமை, நாகரிக வளர்ச்சி போன்ற காரணங்களால் தோலாடைகளின் பயன் பாடும் குறைந்திருக்கலாம்.

பருத்தியும், பட்டும் தமிழரின் ஆடை வளர்ச்சிக்குப் பெரிதும் உதவின. நூலாடைகளும், பட்டாடைகளும் தயார் செய்யப்பட்டு உடுத்தப் பயன்பட்டன. பட்டினை எவ்வாறு பெற்றனர் என்ற குறிப்புகள் சங்க இலக் கியத்தில் இல்லை. ஆடையின் மூலப் பொருட்களை நோக்க எவ்வாறு அம்மூலப்பொருட்களைக் கொண்டு ஆடையை உருவாக்கினர் என்பவற்றைப் பற்றியும் குறிப்புகள் இல்லை.

2. மூலப்பொருட்களைத் தயார்ப்படுத்தல்

நெசவுத் தொழிலுக்கு மூலப் பொருட்களை அதன் இயற்கை நிலையில் பயன்படுத்த முடியாது. சில மாற்றங் களைச் செய்தே பயன்படுத்த முடியும். பருத்தியில், காணப்படும் விதை, அழுக்கு போன்றவற்றை நீக்கித்

Design of Task Scheduling and Fault Tolerance Mechanism Based on GWO Algorithm for Attaining Better QoS in Cloud System

Published: 21 October 2022

Volume 128, pages 2811–2829, (2023) Cite this article

Wireless Personal Communications

Aims and scope

Submit manuscript

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SEYBOLD Report
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ISSN: 1533 - 9211

AN ANALYTICAL STUDY OF RETAIL INVESTORS POST COVID 19 ON INVESTMENT PATTERNS AND PREFERENCES

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Abstract
Nowadays in everyone individual's life investingplays an important role. Even though majority of India's population are covered with youth, importance on awareness towards investment avenues are lacking behind. Also, in March 2020 India was hit by COVID 19 pandemic. Every sector was affected and it had a great impact across the world. The main aim of this research is to analyse the retail investor investment preferences and also the study of investment industry in India with the effect of COVID 19. The study of returns is taken upto March 2021. People are choosing investment avenues where there is no risk or less risk.Due to COVID 19 majority of investors are preferring safety for their investments over returns. Therefore, investor'spreference towards certain classes such as Gold, equity, real estate etc which ensure constant and steady returns at minimum risk created a spike in these sectors in 5 months.Howeverinvesting in Gold, real estate and Equity has not beensignificant to give regular returns but the losing of invested money is negligible. Investor those who are financially aware grabbed this opportunity of rise and fall in the market and invested during this pandemic. From the month of March 2020 to March 2021 the stock market has shaown 75% recovery. To Conclude, investment industry in India has a drastic effect during this COVID 19 pandemic. It not only change investment industry but also all other aspects of human life. Within the short span of time Indian markets have shown good recovery and hopefully will achieve its target.
Keywords: Investment Avenues, Investment Industry, Investment Preferences, Retail Investor, Risk and Return, Stock Market.

Introduction:

An investment is the acquisition of goods that are not used today but are used for the forthcoming to generate wealth. In finance, an investment is a financial asset bought with the purpose that the asset will produce income in the upcoming or will later be sold at more price. Investment is concerned with future earnings, and thus arises with some amount of risk.

Most of the investors like to invest where they wish to get more returns within short period and without losing any money in the name of risk. This is what the reason why many of them are always willing to invest in top investment options where they can double or triple their money within short span of life with zero or less risk. Actually risk and return both are directly related to each other i.e. if the risk is higher, return is also high and vice versa. So, while choosing an

International Journal of Nanoscience
Vol. 22, No. 1 (2023) 2350006 (11 pages)

DOI: 10.1142/S0219581X23500060

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Identifying the Suitability of MoS_2 Nanoparticles by Two Different Methods for Photo Catalytic Applications

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Received 31 October 2022
Accepted 27 November 2022
Published

We report two different methods to synthesize MoS_2 nanoparticles such as co-precipitation and sol–gel. The MoS_2 nanoparticles were characterized by X-ray powder diffraction (XRD), X-ray photoelectron spectroscopy (XPS), Fourier transform infrared (FT-IR) spectroscopy, UV–Visible spectroscopy (UV–Vis) and transmission electron microscopy (TEM), Fourier Transform Scanning electron microscopy (FESEM) with Energy Dispersive Analysis X-ray (EDAX). The nanoparticles prepared by sol–gel method had enhanced average crystallite size and better morphology at the nanoscale level for photo harvesting property. The synthesis methods of MoS_2 nanoparticles are interesting which can be used to control the grain size and surface morphology of nanoparticles. The occurrence of indirect band gap of MoS_2 nanoparticles synthesized by sol–gel method causes efficient photo response activity provided compared to co-precipitation method. The corresponding photocatalytic property of prepared samples with Methylene blue dye under illumination of UV and visible light at room temperature clearly showed that the sample prepared using sol–gel had remarkable efficiency when compared to that of the samples by co-precipitation method.

Keywords: MoS_2 nanoparticles; photoluminescence; sol–gel, co-precipitation.

1. Introduction

The certain development of population and industrialization has put some serious problems related with our day-to-day life and worldwide economy.[1] For the future development of modern technology, two-dimensional transition-metal

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Struggle and Success of Women in Rohinton Mistry's novel *A Fine Balance*

–[1]Dr. K. Kannadasan

Abstract

Women in general are known for their tolerance and sacrifice. Women are given equal rights by the constitution in this independent India. Government takes many steps for the development of the women in the country. But still they are considered as weaker sex. Most of the people have the freedom to make choices in their life. But many times this freedom making a choice was denied to women. Mis only scratches the surface of the broad range of females; he has created in his fiction. Mistry focus on the wives, widows, mothers and single women in each of his books. This paper attempts to make a study on how women are suppressed by the society and how they overcome the Through the character Roopa in *A Fine Balance*, Rohinton Mistry depicts the oppression faced by the woman for their existence in a male dominated society.

Key words: tolerance, sacrifice, constitution, oppression, existence, domination

Roopa and Dukhi were pleased with their boys' progress in learning to sew to their delight. Ishvar made his folks some new outfits. Ishvar enthusiastically described how they picked and matched fabric scraps for clients' requests. They purchased their father a waistcoat and their mother a shirt. Roopa broke down in tears of joy.

Struggle and Success of Women in Rohinton Mistry's novel *A Fine Balance*

Introduction

Rohinton Mistry's writings have a great affinity for Parsis and their culture. Despite the fact that Mistry resides in Canada, he writes virtually little about the country. Instead, he concentrates nearly entirely on India and the Parsi community's place in Indian culture. Even in his short stories about Canada, he frequently depicts the migrated land as the site of a Parsi Diaspora, where the immigrant

Work Cited

1. Mistry, Rohinton. *A Fine Balance*, USA: Vintage International, 1997.Print.
2. Basantani, Vinita. *Representations of Identity: A Critique- Rohinton Mistry*. Authors P,
3. 2016.Print.
4. Bhautoo, Nandini. *Contemporary Indian Writers in English*. Cambridge UP, 2007.Print.
5. Bhabha, Homi K. The Location of Culture. London: Routledge, 1994. Print.
6. Dodiya, Jaydipsinh. *Perspectiveson the Novels of Rohinton Mistry*. Sarup & Sons, 2006. Print.
7. Haldar, Santwana, Ed. *Rohinton Mistry's Such a Long Journey: A Critical Study*. A Book Club, 2006. Print.
8. Jain, Jasbir, ed. *Writers of the Indian Diaspora. Theory and Practice*. Jaipur: Rav Publications, 1998. Print.
9. Rizi, Peter. *Rohinton Mistry*. Manchester University Press, 2004. Print.
10. Williams, Raymond. *Resources of Hope: Culture, Democracy, Socialism*. Londan: Verso, PP.3-4.1989.Print.

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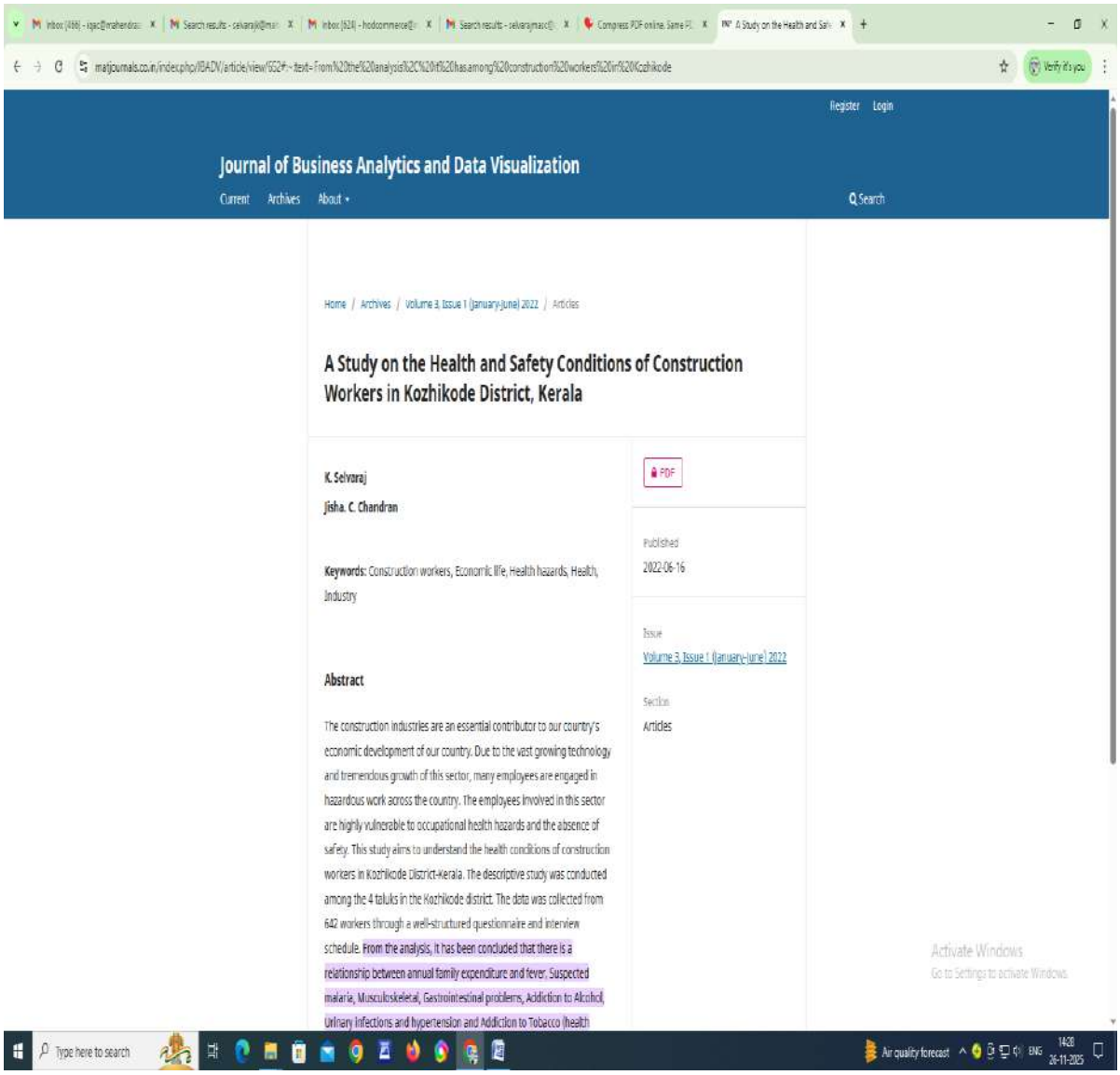
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A Study on the Health and Safety Conditions of Construction Workers in Kozhikode District, Kerala
K. Selvaraj
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PDF
Published
2022-06-16
Issue
Volume 3, Issue 1 (January-June) 2022
Section
Articles
Keywords: Construction workers, Economic life, Health hazards, Health, Industry
Abstract
The construction industries are an essential contributor to our country's economic development of our country. Due to the vast growing technology and tremendous growth of this sector, many employees are engaged in hazardous work across the country. The employees involved in this sector are highly vulnerable to occupational health hazards and the absence of safety. This study aims to understand the health conditions of construction workers in Kozhikode District-Kerala. The descriptive study was conducted among the 4 taluks in the Kozhikode district. The data was collected from 642 workers through a well-structured questionnaire and interview schedule. From the analysis, it has been concluded that there is a relationship between annual family expenditure and fever. Suspected malaria, Musculoskeletal, Gastrointestinal problems, Addiction to Alcohol, Urinary infections and hypertension and Addiction to Tobacco (health
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Impact of Industrial Relations on the Performance of Employees

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Impact of Industrial Relations on the Performance of Employees
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Received:15Oct 2022 Revised:06Nov2022 Accepted:20Nov2022

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ABSTRACT

Industrial relations have enormous significance in industrial life.The term "industrial relations" refers to the interaction between the inside employees' organizations. Using labor management strategies, collective bargaining, and trade unionism often enables industries to maintain industrial peace. This study seeks to establish factors that have the most significant impact on labor relations and the impact of labor relations on employee performance. This study examined the operation of medical facilities in TamilNadu.The researcher took the following factors into account when conducting this study: financial incentives,labor welfare and safety measures,grievance procedures,dispute resolution techniques,trade union activities, leadership competency, working conditions, organizational policies, and individual policies. Five hundred healthcare professionals were given questionnaires to gather preliminary information. Secondary data were compiled from books, magazines, and academic publications. The researcher concludes that factors like financial incentives,laborwe lfare and safety measures, grievance procedures, dispute resolution techniques ,trade union activities, leadership quality, working conditions, organizationalpolicies,andpersonalpoliciesinfluencedindustrialrelationsandthatindustrialrelations have a significant impact on an organization's workforce performance.

Keywords: Industrial relations, labor welfare measures, labor safety measures, grievance redressal, dispute settlement.