MAHENDRA ARTS & SCIENCE COLLEGE

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Kalippatti-637501, Namakkal (Dt), Tamil Nadu, India

ACHIEVEMENTS OF FACULTY MEMBERS

1.NUMBER OF RESEARCH PAPERS PUBLISHED IN JOURNAL (2024-2025)

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/ SCI/SCIE/ Peer reviewed/
1.	2024-2025	Kandasamy Selvam	Biotechnology	Enhanced lipase production and characterization from Aeromonas media VBC8: Applications in biodegradation of lubricating oil waste	Biocatalysis and Agricultural Biotechnology	December-24	62	103423	1878-8181	3.8	Scopus
2.	2024-2025	Kandasamy Selvam, Chinnappan Sudhakar	Biotechnology	Anti-dengue Viral Protein NS5 and Antibacterial Efficacy of Andrographolide from Andrographis paniculata: An In Silico Approach	Applied Biochemistry and Biotechnology	February-25	197	4157–4175	0273-2289	3.3	Scopus, SCIE
3.	2024-2025	Kandasamy Selvam, Chinnappan Sudhakar	Biotechnology	Microplastics occurrence in commercial crab Scylla serrata from Kaveri River of Tamil Nadu: An emerging concern for community health	Water Environment Research	February-25	97 (2)	e70036	1061-4303	1.9	Scopus
4.	2024-2025	Chinnappan Sudhakar, Kandasamy Selvam	Biotechnology	Microplastics in the environment: Types, sources, and impact on human and aquatic systems	Bioresource Technology Reports	February-25	29	102055	2589-014X	4.3	Scopus
5.	2024-2025	Kandasamy Selvam, Chinnappan Sudhakar	Biotechnology	Annona reticulata fruit-based phytosynthesis of zinc oxide nanoparticles and assess antioxidant,	Journal of Crystal Growth	March-25	654	128087	0022-0248	2	Scopus, SCIE

				antibacterial and photocatalytic degradation of textile dyes							
6.	2024-2025	Chinnappan Sudhakar, Kandasamy Selvam,	Biotechnology	Eco-friendly green synthesis and characterization of zirconium oxide nanoparticles using Ulva lactuca and their medical and environmental potential	Journal of Environmental Chemical Engineering	April-25	13 (2)	115862	2213-3437	7.2	Scopus, SCIE
7.	2024-2025	Chinnappan Sudhakar	Biotechnology	Green synthesis of silver nanoparticles using Senna alexandrina leaf extracts and their antibacterial, larvicidal, nanotoxicity and photocatalytic activity	Inorganica Chimica Acta	October-24	571	122220	0020-1693	3.2	Scopus, SCIE
8.	2024-2025	Kandasamy Selvam, Chinnappan Sudhakar	Biotechnology	Microplastics Occurrence in Earthworm (Lampito mauritii) from the Mettur Dam, Southern India and Contamination Indices: Investigation and Indication	Water, Air, & Soil Pollution	Oct-25	236 (13)	850	1573-2932	3	Scopus, SCIE
9.	2024-2025	Chinnappan Sudhakar, Kandasamy Selvam	Biotechnology	Catalytic degradation of methyl orange and biomedical efficacy of sustainable silver nanoparticles from Boerhaavia diffusa leaf extract	Journal of Molecular Structure	Jun-25	1344	142973	1872-8014	4.7	Scopus, SCIE
10.	2024-2025	Kandasamy Selvam, Chinnappan Sudhakar	Biotechnology	Green Synthesis of Luminescent Silver Nanoparticles Using Annona reticulata Fruit: Evaluation of Biological and Environmental Applications	Luminescence	June 2025	40 (6)	e70230	1522-7243	3	Scopus, SCIE
11.	2024-2025	Kandasamy Selvam	Biotechnology	Green synthesis of zinc oxide nanoparticles using Catharanthus pusillus: Characterization, antibacterial,	Journal of Water Process Engineering	August 2025	77	108606	2214-7144	6.7	Scopus, SCIE

				cytotoxicity of A549 cells, and photocatalytic degradation of Eosin (E) dye							
12.	2024-25	A.Jayakumar	Tamil	Mullai Kaliyum Purana Kathaikalum	Arima Nokku	October-2024	18:3	70	2320-4842	-	Peer reviewed
13.	2024-25	M.Guhanathan S.Sakthivel	Mathematics	A Study on Conformal Mapping in Complex Analysis	International journal of Multidisciplinary Educational Research	MAY AND 2025	14 &5(2)	143-148	2277 7881	9.014	UGC
14.	2024-25	S.Sakthivel	Mathematics	Ant Colony Optimization	International journal of Multidisciplinary Educational Research	MAY AND 2025	14 & 5(1)	77-82	2277 7881	9.014	UGC
15.	2024-25	N.Sudha K.Selvaraj	Commerce CA	A Study On Sustainable Goat Farming Practices In Namakkal District,Tamilnadu	International Journal of Creative Research Thoughts	November 2025	13 (11)	F156-f168	2320-2882	7.97	Peer reviewed
16.	2024-25	Dr. B. Marichamy	Chemistry	Synthesis, Complexation, Spectral and Antibacterial Activity of 2-[Z-(Hydroxyimino)Methyl] Phenol and Its Mn(II) Complex	Asian Journal of Research in Chemistry	Feb 27, 2025	18 (1)	5-9	0974-4150 (Online) 0974-4169 (Print)	1.038	UGC
17.	2024-25	K.Selvaraj	Commerce	.A Study On The Working Conditions Of Construction Workers In Kozhikode	Library Progress International	Dec 2024	44 -03	P.1997 0-	2320-317X	5.968	Scopous

				District – Kerala				19979			
18.	2024-25	K.Selvaraj	Commerce	A Study on Customer Satisfaction of Electric Scooters with Special Reference to Women Customers in Urban Areas	International Scientific Journal of Engineering and Management	April 2025	Volume: 04 Issue: 04	1-7	2583-6129	7.839	UGC
19.	2024-25	K.Selvaraj	Commerce	An analysis on the role played by electric scooters in minimizing urban pollution	International journal of creative research thoughts	May 2025	Vol. 03, Issue 5,	D474-d477	2320-2882	7.97	UGC
20.	2024-25	K.Selvaraj	Commerce	Socio-economic status and livelihood contributions of goat farming households in namakkal district, tamil nadu	International Journal of Management and Social Science Research Review	OCT 2025	Vol-12, Issue-10	31-39	2349-6738	7.358	UGC

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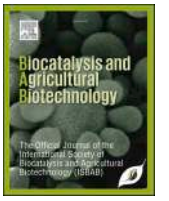

Enhanced lipase production and characterization from *Aeromonas media* VBC8: Applications in biodegradation of lubricating oil waste

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ARTICLE INFO

Keywords:
Lipolytic bacteria
Fish liver
Castor oil
Lipase
Lubricating oil waste

ABSTRACT

This study aimed to explore the potential of a novel indigenous strain for the improved production of lipase from castor oil-contaminated soil. Among the various isolates, *Aeromonas media* VBC8 was found to be the most effective for lipase production. The effect of different inducer oils (olive, peanut, soybean, rice bran, sunflower, coconut, sesame, and fish liver oil) on the biomass of *A. media* VBC8 and its lipase activity was determined. Among the various oils assessed, fish liver oil exhibited highest lipase activity, with 89 U/mL with 9.1 g/L of biomass. Furthermore, Box-Behnken Design was used to optimize the cultural conditions resulting in an enhanced lipase activity of 1156 U/mL. The lipase was purified through ammonium salt (60 w/v %) precipitation, desalting and ion exchange column, achieving a yield of 16 % and specific activity of 98.4 U/mL. The purified lipase remained active over a wide range of pH 4.0–11.0 and temperature of 10–80 °C with maximum activity at pH 8.0 and 40 °C. SDS-PAGE analysis revealed the lipase's molecular weight to be 94 kDa. The study also evaluated the role of crude and purified lipase in the biodegradability of lubricating oil waste, achieving a maximum fatty acid conversion of 39 and 76 %, respectively, after 7 h incubation at room temperature.

1. Introduction

Lipases, an imperative group of biotechnologically pertinent enzymes, catalyze various reactions such as hydrolysis, aminolysis, interesterification, peroxidations, alcoholysis (Contesini et al., 2010) and useful in various industrial sectors, such as food industries (Yu et al., 2022), detergent industries (Thirunavukarasu et al., 2015), biodiesel (Yao et al., 2021), leather industries and pharma industries (Negi, 2018). Lipases are a subclass of esterase, enzymes that catalyze the hydrolysis of esters. While lipases primarily act on triglycerides (the main components of fats and oils), they can also hydrolyze other ester bonds. This ability to catalyze the breakdown of lipids makes them vital in various biological processes and industrial applications (Gupta et al., 2004). The application of lipolytic

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Applied Biochemistry and Biotechnology
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SHORT COMMUNICATION

Anti-dengue Viral Protein NS5 and Antibacterial Efficacy of Andrographolide from *Andrographis paniculata*: An In Silico Approach

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Accepted: 3 February 2025

Abstract
The current study examines the anti-dengue and antibacterial potential and in silico drug development of the andrographolide against the pathogens *Staphylococcus aureus* (1JIJ) and *Pseudomonas aeruginosa* (6MVN) and the dengue viral protein NS5. The phytochemical analysis identified the presence of flavonoids, alkaloids, saponins, tannins, phenols, glycosides, and steroids in the *Andrographis paniculata* methanolic leaf extract. Based on the GC–MS analysis, andrographolide was identified as the primary chemical constituent of the medicinal plant *A. paniculata* and the compound with the largest peak area among other compounds. The agar well diffusion method was employed to observe the antibacterial potential of the methanolic leaf extract against *S. aureus* and *P. aeruginosa*. The maximal inhibition zones were 15.6 ± 0.34 mm and 11.7 ± 0.42 mm, respectively. Additionally, andrographolide was docked with the NS5 viral protein and bacterial proteins, including *S. aureus* TyrRS (PDB: 1JIJ) and *P. aeruginosa* LasR PDB (ID: 6MVN), resulting in a docking score of -20.7384 kJ/mol, -15.0969 kJ/mol, and -11.1171 kJ/mol, respectively. In summary, our molecular docking experiments with the identified andrographolide compound demonstrated its potential as a drug with anti-dengue viral and antibacterial properties.

Keywords Andrographolide · Anti-dengue · Antibacterial · Molecular docking

Introduction

Worldwide, infectious diseases are a leading cause of mortality worldwide, with upper and lower airway diseases being particularly common. Dengue fever is a significant public health concern because it is spreading rapidly in tropical and subtropical regions. It is considered one of the deadliest diseases for humans due to its severe symptoms and possible complications. The dengue virus is primarily transmitted by female *Aedes albopictus* and *Aedes aegypti* mosquitoes in the local environment [1, 2]. It is a flavivirus. Dengue fever has been the most prevalent arthropod-borne viral disease in terms

Extended author information available on the last page of the article

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RESEARCH ARTICLE

water
ENVIRONMENT RESEARCH

Microplastics occurrence in commercial crab *Scylla serrata* from Kaveri River of Tamil Nadu: An emerging concern for community health

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Abstract

Microplastic (MPs) pollution has engulfed global aquatic systems, and the concerns about MPs translocation and bioaccumulation in fish, crabs, and other marine organisms are now an unpleasant truth. In the past few years, MPs pollution in freshwater systems, particularly rivers, and subsequently in freshwater organisms, especially in crabs, has caught the attention of researchers. Rivers provide livelihood to approximately 40% of the global population through food and potable water. Hence, assessment of emerging contaminants like MPs in waterways and the associated fauna is crucial. This study assessed MPs in crab *S. serrata* across the largest riverine system of south India, the Kaveri River. The MPs were characterized by optical microscopy, and field emission scanning electron microscopy-energy dispersive X-ray (FESEM–EDX) analysis for their number, shape, size, and color. Polymer composition was analyzed using attenuated total reflectance Fourier-transform infrared spectroscopy (ATR-FTIR) and Raman spectroscopy. Polypropylene (PP), polystyrene (PS), polyamide (PA), and polyvinyl chloride (PVC) were the dominant plastic polymers in the crab intestine. Additionally, the FE-SEM analysis revealed that the MPs have differential surface morphology with rough surfaces, porous structures, fissures, and severe damage. Most MPs comprised Na, Si, Mg, Cl, K, and Ca, according to EDX analyses. The findings might provide insight into the status of MPs in *S. serrata* at Kavery river that could help in formulating regulations for MPs reduction and contamination in rivers eventually to protect the environment and human health.

Practitioner Points

- The first findings on the identity and properties of MPs in crabs from the Kaveri River at Mettur Dam.
- A simple and cost-effective approach for extracting microplastics from crab samples from Mettur Dam, Kaveri River, Salem District, Tamil Nadu, India.
- Microplastics were detected using optical microscopy, ATR-FTIR, and FE-SEM.

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Microplastics in the environment: Types, sources, and impact on human and aquatic systems☆

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ARTICLE INFO

Keywords:
Microplastics
Sources
Human health
Aquaculture systems

ABSTRACT

Microplastics (MPs) are a persistent and subtle environmental threat that have been linked to aquatic and human health issues. The excessive manufacturing and usage of plastics results in plastic trash disposal, and the plastic degrades into MPs. MPs have a significant influence on human life and aquatic environments, including ingestion and even death. MPs may also offer health hazards to people. The review emphasizes the different origins of MPs and their impacts on aquatic environments, along with the possible dangers to the health of living beings. The discussion encompasses various types of plastics, their sources, and the pathways through which MPs enter humans and aquatic organisms. In this review highlights the critical need for ongoing research into the effects of microplastics (MPs) on both aquatic organisms and human health. As these pollutants become increasingly prevalent in our ecosystems, understanding their biological interactions and potential health implications is essential.

1. Introduction

Plastics are remarkably versatile materials that have become essential to human life, influencing various facets of our everyday activities. This material is frequently utilized for product inclusion and packaging across a wide range of items, from wrapped meals to disposable bottles, due to its versatility, affordability, and convenience (Tursi et al., 2022). Plastic has been used for more than a century, and its annual production has grown from over 230 million tonnes in 2009 to over 350 million tonnes in 2019 (Wang et al., 2021). Plastics break down into components known as microplastics (MPs) after being released into the environment. These materials may comprise plastic fibers, particles, or films and have a thickness of <5 mm. MPs seem to be a concerning new contaminant that is having a major negative influence on human health. Many habitats, including as freshwater, the ocean, soil, and the air, are home to them (Tian et al., 2023).

MPs seem to be a concerning new contaminant that is having a major negative influence on human health. Many habitats, including as freshwater, the ocean, soil, and the air, are home to them (Wang et al., 2021). The occurrence of MPs in aquatic environments raises significant concerns due to their detrimental effects on both aquatic ecosystems and human health (Borah et al., 2024b). Environmental creatures are harmed by microplastics in a number of ways. They may absorb poisons, carry heavy metals and hazardous compounds, and poison the aquatic biota (Xiong et al., 2023). Specifically, the vector potential of microplastics for the numerous types of contaminants present in the environment has been examined only briefly. In addition, numerous publications exclusively address the ecotoxicological hazards to aquatic life or humans, or solely focus on soil or aquatic environments. Additional environmental impacts, particularly those related to terrestrial animal life and global biodiversity, are currently being investigated (Rafa et al., 2024).

The inadvertent consumption has become a global concern for pollution of the environment, causing various illnesses for both humans and animals (Moto et al., 2024). Governments and organisations across have been striving to mitigate this issue by implementing more stringent laws for the recycling and management of plastics. The environment, packaging, and food chain may all contaminate food and beverages. Food may initially be free of microplastics; nevertheless, during processing, transportation, packaging, and storage, it can get contaminated (Fadare et al., 2020). Up until recently, marine environments have been the main focus of MPs and nanoplastics M/NPs techniques for

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Annona reticulata fruit-based phytosynthesis of zinc oxide nanoparticles and assess antioxidant, antibacterial and photocatalytic degradation of textile dyes

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ARTICLE INFO

Communicated by Dongfeng Xue

Keywords:
Annona reticulata fruit
Zinc oxide nanoparticles
Textile dyes
Photocatalytic activity
Antibacterial applications

ABSTRACT

The release of textile dyes into water systems poses a significant risk of increasing the prevalence of multidrug-resistant (MDR) organisms, which can have a detrimental effect on the health of both humans and animals. The efficacy of this method in the efficient removal of multidrug-resistant (MDR) organisms and deleterious dyes from effluent treatment for the purpose of environmental remediation is highly promising. The present study introduces novel zinc oxide nanoparticles (ZnONPs) that are made using *Annona reticulata* fruit extract as a reducing agent in a green production method. We employed UV–Vis spectroscopy, X-ray diffraction (XRD), Fourier-transform infrared (FT-IR) spectroscopy and field emission scanning electron microscopy (FE-SEM) with energy dispersive X-ray spectroscopy (EDX) to analyse the ARF-ZnONPs that were generated through biosynthesis. The antibacterial effects of green synthesised ARF-ZnONPs were evaluated against both gram-positive and gram-negative bacteria. In addition, the degradation of azo dyes (methylene blue and reactive red 120) was measured under direct sunlight exposure. The ARF-ZnONPs were obtained with an absorption peak maximum at 369 nm, as evidenced by the UV–Vis spectrum. According to the research, the nucleation and stability of ARF-ZnONPs are influenced by phenolic compounds, alkaloids, terpenoids, and proteins present in the fruit extract of *A. reticulata*, as demonstrated by FT-IR analysis. A hexagonal wurtzite crystal structure is demonstrated in the XRD pattern of ARF-ZnONPs, with an average particle size of approximately 52 nm. The EDX spectrum verified the presence of the element Zn, and the FE-SEM image featured a hexagonal architecture. Against *S. aureus*, the maximum area of inhibition was 21.23 ± 0.35 mm, while against *P. aeruginosa*, it was 19.34 ± 0.26 mm. The degradation of azo dyes (MB and RR 120) was measured under direct sunlight exposure to evaluate the photocatalytic efficiency of ARF-ZnONPs. Thus, the aforementioned findings indicate that the ARF-ZnONPs synthesised using the environmentally benign method can be employed for a diverse array of antibacterial and environmental applications.

1. Introduction

The most pressing global issue is pollution, which is a result of the unsustainable expansion of industries such as textiles, paints, cosmetics, and plastics [1–3]. Pollution is primarily observed in the contamination of water sources with hazardous waste materials that contain dyes. There is a considerable amount of effluent produced by the textile industry that poses a threat to the global aquatic ecosystem [4–6]. Aquatic organisms and humans are at risk of exposure to unprocessed waste liquids that are discharged from textile industrial sectors due to their carcinogenic and mutagenic properties for a diverse array of antibacterial and environmental applications. Textile effluents containing synthetic organic dyes can impair the biological activity of marine organisms by reducing light penetration. The reduction in luminosity directly affects the process of photosynthesis, hence resulting in repercussions for the entire food web within the aquatic ecosystem. Most synthetic colors are chemically stable and non-biodegradable, making even small amounts of them exceedingly unwanted and toxic. They have

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Eco-friendly green synthesis and characterization of zirconium oxide nanoparticles using *Ulva lactuca* and their medical and environmental potential

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ARTICLE INFO

Keywords:
Ulva lactuca
Zirconium oxide nanoparticles
Biomedical applications
Environmental applications

ABSTRACT

The main goal of the study, *Ulva lactuca* mediated zirconium oxide nanoparticles (UL-ZrO_2NPs) synthesis in an eco- friendly manner and their medical and environmental potential. The synthesized UL-ZrO_2NPs were characterized using UV–visible spectrophotometer, FT-IR, XRD, and FESEM-EDS. The synthesized UL-ZrO_2NPs were used as antioxidant, antibacterial, anticancer and photocatalytic activity. The UV–visible spectra showed that the UL-ZrO_2NPs formed at an absorption peak maximum of 275 nm. FT-IR analysis shows the presence of terpenoids, flavonoids, primary amines, carboxylic acids, and alkyl halides biomolecules in both algae and UL-ZrO_2NPs. FE-SEM analysis revealed that the synthesized UL-ZrO_2NPs were cylinder tetragonal nanostructures with size range from 27 to 41 nm and EDS spectra were corroborated the signal characteristic of zirconium and oxygen at 2 KeV and 0.5 KeV. XRD of UL-ZrO_2NPs shows the strongest peak corresponding to planes confirmed crystalline nature. The produced UL-ZrO_2NPs showed a scavenging inhibition of 91.2 % in their antioxidant activity. The zone of inhibition was identified in both Gram-positive and Gram-negative pathogenic bacteria, indicating antibacterial action. The photocatalytic degradation of dyes (malachite green and eosin) were founded as 93.6 % and 86.2 % respectively. These findings showed that *U. lactuca* extract mediated UL-ZrO_2NPs possess promising biomedical and environmental pollutants removal.

1. Introduction

Metal nanoparticles is the study of nanoscale matter manipulation with the purpose of developing novel nanomaterials, such as metal oxide nanoparticles, with exceptional properties and dimensions less than 100 nm [1,2]. Nanoparticles have several desirable characteristics, including a large surface area, long lifespan, enhanced stability, and recyclability [3,4]. They have several applications in the medical and environmental remediation fields, including therapeutic agent, anti-bacterial activity, antioxidant activity, medication delivery, wound healing activity, anti-inflammatory activity, electrochemical sensor, and wastewater treatment [5,6]. Nanoparticles of metal oxides have been mass-produced by combining metallic salts with extracts of bacteria, fungi, and plants are used. In addition to being easily synthesized, they possess distinctive properties such as a porous shape and a very stable nature [7]. Zirconium oxide (ZrO) is an intriguing substance that finds utility in numerous technical sectors, including but not limited to ceramic fabrication, medication delivery, electrochromic devices, dental implant, electrochemiluminescence sensors, fuel cells, photocatalytic degradation and water purification [8–10]. Various physicochemical

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Research paper

Green synthesis of silver nanoparticles using *Senna alexandrina* leaf extracts and their antibacterial, larvicidal, nanotoxicity and photocatalytic activity

Venkatachalam Sangameshwaran [a], Arunagiri Ragu Prasath [a], Kandasamy Selvam [b], Ahmad J. Obaidullah [c], Krishna Kumar Yadav [d,e], Chinnappan Sudhakar [a,*]

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ARTICLE INFO

Keywords:
Antibacterial activity
Larvicidal activity
Photocatalytic activity
Senna alexandrina
Silver nanoparticles

ABSTRACT

Biological synthesis of metal nanoparticles has been discovered in recent years, and they have been effectively manufactured and studied from diverse plant extracts. Recent research has shown that nanoparticles have extremely promising antibacterial, larvicidal and anticancer effects. The current study aimed to synthesize *Senna alexandrina* leaf extract-mediated silver nanoparticles (SA-AgNPs) as are reducing and capping agent. The produced SA-AgNPs were characterized by using UV–visible spectroscopy, Fourier-transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD), and Field emission scanning electron microscopy with energy dispersive spectroscopy (FESEM-EDS). The result showed synthesized SA-AgNPs were confirmed by UV–visible spectroscopy with 440 nm absorption. FT-IR analysis shows the presence of phosphine, primary amines, carboxylic acids, ether, and alkyl halides biomolecules in both plant extract and SA-AgNPs. XRD findings revealed the crystalline structures of produced SA-AgNPs. The spherical shape of SA-AgNPs with an average size of 20–35 nm was confirmed using FESEM. The SA-AgNPs show better antibacterial activity against *E. coli* (18.0 ± 0.25 mm), *S. aureus* (17.2 ± 0.36 mm), *P. aeruginosa* (16.8 ± 0.12 mm), and leaf extract of *S. alexandrina* showed minimal antibacterial activity. The SA-AgNPs show 100 % mortality for both *Cx. quinquefasciatus* and *Ae. aegypti* after 48 hrs. The brine shrimp lethal assay of the SA-AgNPs shows 100 % at 30 μg after 24 hrs of brine shrimp which indicated the presence of cytotoxicity this suggests that produced SA-AgNPs are slightly toxic. The photocatalytic activity was also tested using reactive orange 16 (RO16) and phenol red (PR) with the percentage of degradation being about 93.95 % and 92.91 % respectively. These results suggest that biosynthesized SA-AgNPs have promising properties that can be used as an effective biomedical and environmental protectant.

1. Introduction

Nanoparticles with dimensions ranging from 1-100 nm are at the cutting edge of nanoscience and nanotechnology. Nanomaterials, notably nanoparticles, have piqued the curiosity of researchers in fields ranging from materials science to biology [1]. Nanomaterials have been developed for a wide range of industries, including environmental remediation, electronics, cosmetics, structural materials, and also biomedical sciences such as drug delivery, medical diagnostics and imaging, and cancer therapy [2]. Due to the advancements and various developments in material science and chemistry, different types of nanomaterials with different properties can be produced on a large scale [3]. The chemical composition of the nanomaterials found to be very complex, it depends on interaction with other chemicals and it has specific physicochemical properties due to their large surface area. The nanomaterials exhibit organized crystalline structures, which can also be amorphous or arrange themselves in pseudo-close packing, resulting in unclassifiable crystallographic space groups. and its surface energy depends upon the number of atoms present in the nanomaterials surface charge is described by Zeta potential [4]. It might be used in catalysis, environmental cleanup, medication delivery, biological labeling, and chemical sensing and imaging [5]. In addition to its various benefits, it

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Microplastics Occurrence in Earthworm (*Lampito mauritii*) from the Mettur Dam, Southern India and Contamination Indices: Investigation and Indication

Arunagiri Ragu Prasath · Kandasamy Selvam · Krishna Kumar Yadav · Mosab Kaseem · Chinnappan Sudhakar · Ahmad J. Obaidullah

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Abstract Ubiquitous pollution due to microplastics through the food chain is a major cause of various deleterious effects on human and animal health. This study aimed to investigate the existence and characterization of microplastics in earthworms (*Lampito mauritii*) collected from the Kaveri River, Mettur Dam, Southern India. The MPs were extracted from 40 earthworms by 10% of potassium hydroxide digestion medium. The extracted MPs were characterized using an optical microscope, Attenuated total reflectance-Fourier-transform infrared (ATR-FT-IR) spectroscopy, and field emission scanning electron microscopy-energy dispersive X-ray analysis (FESEM-EDX). Totally, 435 MPs are particles in the gut of the 40 earthworms, and four forms of MPs are fragments, films, threads, and pellets along with the smallest (0.1 mm) and greatest (1 mm) of MPs. ATR-FT-IR spectrum indicated three prominent polymer compounds, namely cellophane (CP), polyamide (PA), and polyarylether (PAE). The FESEM images observed that the majority of the microfibers had smooth surfaces and linear forms along with attachment of heavy metals. Our results highlight the preliminary insights into the presence of MPs in earthworm gut.

Keywords Microplastics · Occurrence · *Lampito mauritii* · Microplastics extraction · Contamination

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Catalytic degradation of methyl orange and biomedical efficacy of sustainable silver nanoparticles from *Boerhaavia diffusa* leaf extract

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ABSTRACT

The current study focused on the effective green synthesis of silver nanoparticles (AgNPs) from *Boerhaavia diffusa* (BD) leaf extract, demonstrating their potential in antibacterial, anticancer, and photocatalytic applications. The formation of B. diffusa silver nanoparticles (BD-AgNPs) was confirmed by an absorption peak at 420 nm using UV–visible spectroscopy. Fourier-transform infrared (FT-IR) spectroscopy represented the presence of bioactive functional groups in BD that were involved in the reduction and capping of BD-AgNPs. The X-ray diffraction (XRD) analysis confirmed the crystalline nature and face-centered cubic (fcc) structure of BD-AgNPs. Further, high-resolution transmission electron microscopy (HR-TEM) results confirmed that the BD-AgNPs were small in size and had an average particle size of 30 nm. The presence of Ag peaks with a significant signal at 3.0 keV was shown by energy dispersive X-ray spectroscopy (EDS). The biosynthesized BD-AgNPs showed the highest antibacterial activity against *Escherichia coli* (18 ± 0.75) and *Staphylococcus aureus* (16 ± 0.58) and also shows MIC assay shows lowest value of BD-AgNPs against *E. coli* (7.25 μg/mL) and *S. aureus* (12.75 μg/mL), respectively. The BD-AgNPs were also found to be cytotoxic against A549 lung cancer cells. Furthermore, BD-AgNPs demonstrated 91.26 % photodegradation efficacy for methyl orange (MO) after 200 min of exposure under sunlight irradiation. The findings indicate that these biogenic BD-AgNPs possess significant antibacterial properties and cytotoxic effects on lung cancer cells (A549), suggesting their utility in medical treatments. In addition, the high efficiency in photocatalytic degradation of pollutants underscores their environmental remediation capabilities, making them valuable in healthcare and environmental sectors.

1. Introduction

Nanotechnology is a fast-evolving scientific area that involves the development of novel materials. Noble metal nanoparticles have attracted the numerous interests according to their remarkable applications in biological, medicinal, chemical, physical, and materials science [1–3]. Nanoparticles are synthesized using a variety of mechanisms, including biological, physical, and chemical processes. Because of its simplicity, ease of availability, non-toxic and safe handling, the biosynthetic technique has emerged as a viable alternative to chemical synthesis. Various biological systems, such as plant extracts [4], algae [5], bacteria [6], and fungi [7] were employed for nanoparticle fabrication. Synthesized silver nanoparticles (AgNPs) were exposed to have antimicrobial, antifungal, anti-inflammatory, anticancer, and antidiabetic effects. Metallic nanoparticle synthesis has established a lot of interest, particularly in the optical, electrical,

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RESEARCH ARTICLE

Green Synthesis of Luminescent Silver Nanoparticles Using *Annona reticulata* Fruit: Evaluation of Biological and Environmental Applications

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Keywords: *Annona reticulata* | antibacterial action | antioxidant test | catalytic applications | silver nanoparticles

ABSTRACT

Green metal nanoparticles are used as building blocks for nanomedicine because they are safe, cheap, and last a long time. Natural products combined with silver nanoparticles (AgNPs) were identified by researchers to have applications in medicine and the environment. Our study focused on creating *Annona reticulata* fruit-based luminescent silver nanoparticles (ARF-AgNPs) and their antioxidant, antibacterial, and photocatalytic potential. The *A. reticulata* fruit-based luminescent silver nanoparticles (ARF-AgNPs) were characterized by UV–visible spectroscopy, Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD), and field emission scanning electron microscopy with energy dispersive X-ray spectroscopy (FESEM-EDX). The antioxidant action of ARF-AgNPs against DPPH radicals was found to show that at 500 μg/mL, their activity level ranged from up to 80.21 ± 0.91%. As bacterial pathogens, *Staphylococcus aureus* and *Pseudomonas aeruginosa* were used to assess the bactericidal efficacy of ARF-AgNPs. Furthermore, capable of accelerating the malachite green (MG) dye responses were the green ARF-AgNPs. Therefore, these findings suggest a feasible method for producing ARF-AgNPs from *A. reticulata* fruit rind, which can be used in several chemical and medicinal applications.

1 | Introduction

Nanomaterials and particles with sizes extending from 1 to 100 nm are the subject of the broad scientific field of nanoscience. These particles have become critical components in a variety of fields, including medicine, drug delivery, food safety, agriculture, textile fabrication, catalysis, environmental protection (for the removal of toxic pollutants), energy, and electronics [1–5]. Nanoparticles (NPs) are experiencing a daily surge in global usage due to their potential applications in antibacterial, anti-inflammatory, and antifungal properties [6–9]. Nanotechnology is one of the most innovative and economic development areas of science, and the nanofield is one of the massive-growing industries. It is also described as the "next industrial revolution." There are a variety of techniques available for the synthesis of NPs, such as gold, silver, selenium, copper, iron, cobalt, and zinc. These techniques include physical, chemical, biological, and hybrid methods. Among these metallic NPs,

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Green synthesis of zinc oxide nanoparticles using *Catharanthus pusillus*: Characterization, antibacterial, cytotoxicity of A549 cells, and photocatalytic degradation of Eosin (E) dye

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ABSTRACT

The current study examines the green synthesis of zinc oxide nanoparticles (ZnO NPs) using an aqueous extract of *Catharanthus pusillus*, which is an eco-friendly and sustainable approach. The produced ZnO NPs were investigated by Ultraviolet-Visible Diffuse Reflectance Spectrometer (UV/DRS), Fourier Transform-Infrared Spectroscopy (FT-IR), X-ray Diffraction (XRD), X-ray Photoelectron Spectroscopy, Field Emission-Scanning Electron Microscopy (FE-SEM) & Energy Dispersive X-ray (EDX) and Thermogravimetric analysis (TGA). The surface plasmon resonance (SPR) was measured using UV/DRS at 347 nm and bandgap energy 3.12 eV by Tauc's plot. FT-IR spectral analysis confirms the presence of tannins, carboxyl, and phenolic functional groups. The XRD pattern of CP-ZnO NPs signifies a crystalline hexagonal shape, and the average size of the particles was about 18.5 nm. FE-SEM was used to evaluate the surface shape and structure of the ZnO NPs and the EDX spectrum, which showed a distinctive metallic Zinc peak at 8.70 keV. TGA demonstrated excellent thermal stability with only 13.79 % weight loss up to 800 °C. ZnO NPs derived from *C. pusillus* showed significant antibacterial properties against human pathogens *Enterococcus faecalis* (25 ± 1.04 mm), *Staphylococcus aureus* (18 ± 0.82 mm), *Candida albicans* (19 ± 0.94 mm), *Escherichia coli* (24 ± 0.96 mm) and *Klebsiella pneumoniae* (22 ± 1.01 mm) at 100 µg/mL. Cytotoxicity assay reveals green synthesis of CP-ZnO NPs with IC_{50} values of 36.63 µg/mL against the A549 lung cancer cell line at 100 µg/mL. Additionally, synthesized ZnO NPs of photocatalytic activity were evaluated by degradation of Eosin (E) dye, and degradation of 82 % at 180 mins.

1. Introduction

Nanotechnology, a rapidly advancing field that focuses on materials and particles smaller than 100 nm, is revolutionizing industries worldwide, offering cutting-edge solutions across diverse applications [1,2]. Among these nanomaterials, ZnO nanoparticles stand out due to their exceptional stability, antimicrobial, anticancer, and photocatalytic properties, making them a valuable resource in both healthcare and environmental sectors [3]. To address these environmental concerns of conventional synthesis methods, green synthesis has come to attention as a sustainable approach for NPs assembly. This eco-friendly make use of biological agents like plant extracts, which offer advantages such as

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முல்லைக்கலியும் புராணக்கதைகளும்

முனைவர் அ. ஜெயக்குமார்

உதவிப்பேராசிரியர், மஹேந்ரா கலை அறிவியல் கல்லூரி (தன்னாட்சி), காளிப்பட்டி, நாமக்கல் மாவட்டம் 637501 (இணைவு: பெரியார் பல்கலைக்கழகம்)

கற்றறிந்தார் ஏத்தும் கலி எனப் போற்றப்பெறும் கலித்தொகை, கடவுள் வாழ்த்துடன் 150 பாடல்களைக் கொண்டது. அகப்பொருளைப் பாடுதற்கேற்றதாகக் கலிப்பாவையும் பரிபாடலையும் தொல்காப்பியர் குறிப்பிடுகிறார்.

எட்டுத்தொகையுள் சிதைவின்றிக் கிடைக்கப்பெறும் நூல்கள் கலித்தொகையும் அகநானூறும் ஆகும். கலிப்பாக்கள் பல வகைப்படும். அவற்றுள் ஒத்தாழிசைக்கலிப்பாவில் கலித்தொகைப் பாடல்கள் அமைந்துள்ளன. தொல்காப்பிய அகத்திணையியலில்

கைக்கிளை முதலாப் பெருந்திணை இறுவாய்
முற்படக் கிளந்த எழுதிணை என்ப என்ற நூற்பா குறிப்பிடும் கைக்கிளை (56, 57, 58, 100) பெருந்திணைப் (139, 140) பாடல்கள் சங்க இலக்கியத்தில் கலித்தொகையில் (138) மட்டுமே இடம்பெற்றுள்ளன என்பது குறிக்கத்தக்கது.

நற்றிணை, குறுந்தொகையின் முதற்பாடல்கள் குறிஞ்சித்திணையிலும் ஐங்குறுநூறு முதற்பாடல் மருதத்திணையிலும் அமைய, அகநானூறு, கலித்தொகை ஆகியவற்றின் முதற்பாடல்கள் பாலைத்திணையில் அமைந்துள.

திணை அமைப்பு முறை

பாலை, குறிஞ்சி, மருதம், முல்லை, நெய்தல் என்னும் வகையில் திணை அமைப்பு முறை அமைந்துள்ளது. கலித்தொகையில் உள்ள பாடல்கள், கடவுள் வாழ்த்து - 1 (நல்லந்துவனார்), பாலை - 35 (பாலை பாடிய பெருங்கடுங்கோ), குறிஞ்சி - 29 (கபிலர்), மருதம் - 35 (மருதனிள நாகனார்), முல்லை - 17 (சோழன் நல்லுருத்திரன்), நெய்தல் - 33 (நல்லந்துவனார்) என்ற முறையில் அமைந்துள்ளன.

கலித்தொகைக்கு உரைகண்டவர் ***உச்சிமேற் புலவர் கொள் நச்சினார்க்கினியர்*** ஆவார். தொல்காப்பியம், பத்துப் பாட்டு சீவகசிந்தாமணி போன்றவற்றிற்கு இவர் எழுதியுள்ள உரைகளைவிட கலித்தொகைக்கு எழுதியுள்ள உரை சிறந்தது என அறிஞர்கள் போற்றுவர். எட்டுத்தொகையுள் முதலில் (1887) இந்நூலே பதிப்பிக்கப்பெற்றது.

கலித்தொகையை நச்சினார்க்கினியர் உரையுடைன் முதலில் பதிப்பித்தவர் யாழ்ப்பாணத்துத் தமிழறிஞர் சி. வை. தாமோதரம்பிள்ளை ஆவார். அதன்பின்னர் சென்னை மாநிலக்கல்லூரியில் பணியாற்றிய இ.வை. அனந்த ராமையர் 1925இல் இரு பகுதிகளையும் 1931இல் மூன்றாம் பகுதியையும் வெளியிட்டார். கலித்தொகையின் மிகச்சிறந்த பதிப்பென இப்பதிப்பு தமிழ்ச்சான்றோரால் பாராட்டப்பெறுகிறது. முதல் பகுதியில் பாலையும், குறிஞ்சியும் இரண்டாம் பகுதியில் மருத, முல்லைக்கலிகளும் மூன்றாம் பகுதியில் நெய்தல் கலி, பாடினோர் வரலாறு, அரும்பத அகராதி போன்றவையும் இடம்பெறுகின்றன. ***சிறந்த ஒரு பதிப்பு எத்தனை வகையாக ஆராய்ச்சி செய்து பதிப்பிக்கப்பட வேண்டுமோ அத்தனை வகையிலும் சிறிதும் குறைவின்றி ஆராய்ச்சி செய்யப் பெற்று இப்புத்தகம் விளங்குகின்றது*** என்று உ.வே.சா இதனைப் பாராட்டியுள்ளமை குறிக்கத் தக்கது.

சோழன் நல்லுருத்திரன் சோழர் குடியைச் சேர்ந்தவராக இருந்தாலும் பாண்டி நாட்டில் வாழ்ந்தவராக இருக்கலாம். ஏறுகளை வெள்ளை, காரி, குரால் (செங்காரி) புள்ளி வெள்ளை (புள்ளிகளையுடைய வெள்ளேறு) போன்ற பலநிறங்கலந்த ஏறுகளையும் இயல்பாக கூறிச்செல்லும் இவர் ஏறு தழுவுதலை மிக விரிவாகக் காட்சிப்படுத்தியமை எண்ணத்தக்கது. உவமைகளை ஆயர் வாழ்வியலைச் சார்ந்து கூறியுள்ளமை ஆயர் வாழ்வியலை இவர் நன்கு அறிந்தவர் என்று உணரமுடிகின்றது. புறநானூற்றில் 190-வது பாடலையும் இவர் பாடியுள்ளார்.

முல்லைக்கலியில் பீமன் துச்சாதனனைக் கொன்றமை, அசுவத்தாமன் திட்டத்துய்மனைக் கொன்றமை, கிருஷ்ணன் கேசி என்னும் அரக்கனைக் கொன்றமை, கிருஷ்ணன் மகாபாரதப்போரில் சங்கு ஊதியமை, நிலவை விழுங்கிய பாம்புகளைத் திருமால் கொன்றமை, பாண்டவர்களும் கௌரவர்களும் போரிட்ட போர்க்களம், சிவன் எமதர்மனின் நெஞ்சைப் பிளந்தமை, சிவன் நிலவைச் சூடியமை, சிவனின் கழுத்து நீல நிறத்தில் உள்ளமை, முருகன் சூரபத்மனைக் கொன்றமை இந்திரனின் உடலில் ஆயிரம் கண்கள் உள்ளமை போன்ற புராணக் கதைகள் இடம்பெற்றுள்ளன.

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A STUDY ON CONFORMAL MAPPING IN COMPLEX ANALYSIS

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ABSTRACT:

Conformal mappings, also known as conformal transformations, are functions that map complex planes in a way that preserves the angles between curves. This means that if two curves intersect at a certain angle in the original plane, they will also intersect at the same angle in the transformed plane.

KEYWORDS: Complex Analysis, Conformal mapping and transformations

I INTRODUCTION:

Conformal mapping is an important technique used in complex analysis and has many applications in different physical situations. If the function is harmonic (ie, it satisfies Laplace's equation ($\nabla^2 f = 0$) then the transformation of such functions via conformal mapping is also harmonic. So equations pertaining to any field that can be represented by a potential function can be solved via conformal mapping. Also the conformal map is a function which preserves the angles.Conformal map preserves both angles and shape of infinitesimal small figures but not necessarily their size.More formally, a map $w = f(z)$ is called conformal (or angle-preserving) at $z_0$if it preserves oriented angles between curves throughz_0, as well as their orientation, i.e. direction. An important family of examples of conformal maps comes from complex analysis.

If U is an open subset of the complex plane, , then a function f :U → C is conformal if and only if it is holomorphic and its derivative is everywhere non-zero on U. If f is antiholomorphic (that is, the conjugate to a holomorphic function), it still preserves angles, but it reverses their orientation. The Riemann mapping theorem, states that any nonempty open simply connected proper subset of C admits a bijective conformal map to the open unit disk(the open unit disk around P (where P is a given point in the plane), is the set of points whose distance from P is less than 1) in complex plane C ie if U is a simply connected open subset in complex plane C, which is not all of C,then there exists a bijective ie one-to-one mapping f from U to open unit disk D.

In complex analysis, boundary behavior refers to the behavior of a function at the boundary of its domain. For example, a function may be analytic within a certain region, but its behavior at the boundary of that region may be different.In complex analysis, conformal mapping of polygons is a powerful technique used to transform a polygonal region in the complex plane into a simpler region, such as the unit disk or the upper half-plane, while preserving angles and shapes. This is achieved through the use of analytic functions, which are functions that can be represented as a power series in the complex plane. The Schwarz-Christoffel transformation is a fundamental tool in this context, allowing for the conformal mapping of a polygon to the upper half-plane. This transformation involves the use of a complex integral, which maps the polygon's vertices to points on the real axis, and its interior to the upper half-plane. Similarly, the Schwarz-Christoffel mapping can be used to transform a polygon to the unit disk. Conformal mapping of polygons has numerous applications in various fields, including electromagnetic theory, fluid dynamics, and mathematical modeling, where it is used to solve complex problems by transforming them into simpler ones. By preserving angles and shapes, conformal mapping of polygons provides a valuable tool for analyzing and solving problems involving polygonal regions in the complex plane. Next, In complex analysis, harmonic functions play a vital role in understanding the behavior of analytic functions. A closer look at harmonic functions reveals that they are the real or imaginary parts of analytic functions. In other words, if f(z) is an analytic function, then both the real part u(x,y) and the imaginary part v(x,y) of f(z) are harmonic functions. Harmonic

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ANT COLONY OPTIMIZATION

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Abstract

Ant colony optimization is a technique for optimization that was introduced in the early 1990's. The inspiring source of ant colony optimization is the foraging behavior of real ant colonies. This behavior is exploited in artificial ant colonies for the search of approximate solutions to discrete optimization problems, to continuous optimization problems, and to important problems in telecommunications, such as routing and load balancing. First, we deal with the biological inspiration of ant colony optimization algorithms. We outline ant colony optimization in more general terms in the context of discrete optimization, and present some of the nowadays best-performing ant colony optimization variants. We demonstrate how ant colony optimization can be applied to continuous optimization problems. Finally, we provide examples of an interesting recent research direction.

Keywords: Ant colony optimization, Algorithms, Artificial.

I. INTRODUCTION

Ants are the smallest species. There are 13800 estimated ant species worldwide. An ant can lift 20 times its own body weight. Queen ants can live for 30 years and have millions of babies. Ants don't have ears. Ants "hear" by feeling vibrations in the ground through their feet. Queen ants have wings, which they shed when they start a new nest. Ants don't have lungs. Oxygen enters through tiny holes all over the body and carbon dioxide leaves through the same holes. When the queen of the colony dies, the colony can only survive a few months. Queens are rarely replaced and the workers are not able to reproduce. Although ants are frustrating when they get into your home or when you're having a picnic, ants do help the environment. They are social insects, which mean they live in large colonies or groups.

There are three kinds of ants in a colony: The queen, the female workers and males.

The queen and the males have wings, while the workers don't have wings. The queen is the only ant that can lay eggs. The male ant's job is to mate with future queen ants and they do not live very long afterwards. Once the queen grows to adulthood, she spends the rest of her life laying eggs! Depending on the species, a colony may have one queen or many queens.

Ant colonies also have soldier ants that protect the queen, defend the colony, gather or kill food, and attack enemy colonies in search for food and nesting space. If they defeat another ant colony, they take away eggs of the defeated ant colony. When the eggs hatch, the new ants become the "slave" ants for the colony. Ant undergoes several physical developments during their life span. An ant goes through a complete metamorphosis, which means ants have four stages – egg, larva, pupa and adult in the course of their life cycle. Ant colony has many rooms or compartments to store food, protect eggs, etc… Ants communicate with each other using pheromones. Pheromones are the chemical substance used by ants for communication. Ants also deposit pheromones in case of any danger to alert others. Ants detect pheromones using their mobile antenna. Ants leave pheromones on the soil so that it can be detected by other ants.

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A Study On Sustainable Goat Farming Practices In Namakkal District, Tamil Nadu

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ABSTRACT

Goat farming is a significant agricultural activity in Namakkal district, Tamil Nadu, contributing substantially to the livelihood of small and marginal farmers. Sustainable goat farming practices are essential to ensure the long-term viability of this activity. This article discusses the best practices for sustainable goat farming in Namakkal district, focusing on selecting suitable breeds, improving genetic quality, and implementing breeding programs to enhance productivity and providing high-quality fodder, ensuring adequate nutrition, and promoting grazing with supplementation and implementing regular vaccination, parasite control, and veterinary care to maintain goat health and developing market linkages, improving price fixation, and promoting value-added products. The study further assesses the profitability of goat farming through cost and returns analysis and identifies major constraints faced by farmers such as inadequate veterinary services, fluctuating market prices, feed scarcity, and limited credit availability. The findings indicate that goat farming significantly supplements household income, enhances food and nutritional security, and provides substantial self-employment opportunities, especially for women and marginal farmers.

Sustainable goat farming practices can improve productivity, income, and livelihood security for farmers in Namakkal district. Government support, extension services, and farmers' organizations play a crucial role in promoting these practices.

Key words: Sustainable Goat farming, Long-term viability, Breeding, Feeding, Health management, Marketing, Livelihood security.

INTRODUCTION

Goat farming is an integral part of livestock production in Tamil Nadu, particularly in the Namakkal district. The state's diverse geography and climate make it an ideal location for rearing goats. Sustainable goat farming practices are essential to ensure the long-term viability of this agricultural activity. This article discusses the best practices for sustainable goat farming in Namakkal district, Tamil Nadu.Goat farming in India is a very profitable business with minimum investment. Goat farming can be done in small to large

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industrial scale. Here is the complete information on starting a goat farming project. Goat farming in India is a well-established, antiquated form of farming especially in places where dry land farming system is practiced. It is generally practiced by farmers who have a very small area of land for farming. Sometimes landless laborers also undertake goat farming since the risk, initial investments etc are much lower than other forms of farming. Goats are hence rightly called as "poor man's cow" since it has promises of good return that can serve as investment source.

The study further assesses the profitability of goat farming through cost and returns analysis and identifies major constraints faced by farmers such as inadequate veterinary services, fluctuating market prices, feed scarcity, and limited credit availability. The findings indicate that goat farming significantly supplements household income, enhances food and nutritional security, and provides substantial self-employment opportunities, especially for women and marginal farmers. Such an inquiry will help identify strengths, limitations, and opportunities for enhancing the productivity and profitability of goat enterprises. The findings would support informed policymaking, targeted interventions, and improved support services for rural development.

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RESEARCH ARTICLE

Synthesis, Complexation, Spectral and Antibacterial Activity of 2-[Z-(Hydroxyimino)Methyl]Phenol and Its Mn(II) Complex

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ABSTRACT:
A new Schiff base, 2-[Z-(hydroxyimino)methyl]phenol (SAOX), has been synthesized from salicylaldehyde and hydroxylamine hydrochloride. 2-[E-(hydroxyimino)methyl] phenolmanganate(II) [$Mn(SAOX)_2$] was prepared from sulphate salt of Mn(II) in an alcoholic medium. The chemical structures of the SAOX and [$Mn(SAOX)_2$] were confirmed by various spectroscopic studies like IR, ^1H NMR, ESR, ESI-mass spectra, elemental analysis, molar conductance. On the basis of elemental and spectral studies, six coordinated geometry was assigned to these complexes. The free Schiff base and its complexes have been tested for their antibacterial activity by using disc diffusion method and the results discussed.

KEYWORDS: Manganese complex, Hydrated complex, Antibacterial activity, Intramolecular hydrogen bonding, d-d transistion.

1. INTRODUCTION:
In recent years, the chemistry of coordination compounds has shown a rapid development in diverse disciplines as a result of the possible use of these new compounds in biological applications. Transition metal complexes with potential biological activity are the focus of extensive investigations. Oximes and azo dyes have often been used as chelating ligands in the field of coordination chemistry and their metal complexes have been of great interest for many years. The biological importance of oximes and their complexes is very well known.[1] Different oximes and their metal complexes have shown notable bioactivity as chelating therapeutics, as drugs, as inhibitors of enzymes and as intermediates in the biosynthesis of nitrogen oxides.[2,3]

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Transition metal complexes with o-hydroxy aromatic oximes have attracted much attention as they exist as cis and trans geometrical isomers. Copper complexes are known to assume trans structures while cobalt complexes have cis structures.[4] The presence of mildly acidic hydroxyl groups and slightly basic nitrogen atoms makes vic-dioximes amphoteric ligands, which form square-planar, square-pyramidal or octahedral complexes with transition metal ions such as Ni(II), Co(II) and Cu(II) as the central atom.[5]

Salicylaldoxime and its derivatives have been the focus of comprehensive research in coordination chemistry[6-10]. Because of their richly painted complexes with a wide structural variety developed with the majority of transition metals[11-15]. Due to the importance of oxime compounds and in continuance of interest in the synthesis, spectral properties of salicylaldoxime compound and its Mn(II) complexes are reported herein.

2. METERIALS AND METHODS:
2.1 Chemicals:
All chemicals used in this work were reagent grade (BDH/ Aldrich), including the metal salts i.e. $MnSO_4.6H_2O$, Ethanol, salicylaldehyde, hydroxylamine hydrochloride, chloroform, DMSO, $CaCl_2$, NH_4OH. Double distilled water was used.

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"A Study On The Working Conditions Of Construction Workers In Kozhikode District - Kerala"

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ABSTRACT

Construction Sectors are one of the largest providers of economic development in India. After urbanization and modernization construction industries in India are booming with huge ongoing opportunities. Moreover, they are the largest provider of employment opportunities in our country. One of the largest categories of workers in the unorganized sectors were construction workers. Construction works are highly labour intensive and highly mechanised. This study aims to understand the working conditions of construction workers in Kozhikode District-Kerala. This study was based on primary data. The statistical tools used in this study are reliability analysis, cluster analysis and factor analysis are used to interpret the result, for this sample of 642 workers were selected from the 4 Taluks of Kozhikode District. This study will help to improve the government interventions for the upliftment of the working conditions of construction workers.

KEYWORDS: Construction Industries, construction workers. Working conditions

1. INTRODUCTION

Construction industries are playing an awfully vital role for the economic development of our country, because of the advancement of knowledge technology and economic process construction industries are currently in an exceedingly distinguished place in industrial sector. In India a large number of people are operating below the unorganised sector. Construction industry provides numerous kinds of employment opportunities. After the agricultural sector construction industries are within the second largest contributor to the Gross Domestic merchandise. Construction employees represent one amongst the most important classesof employees within the unorganized sector. Construction jobs are extremely labour intensive and conjointly extremely mechanized. It provides substantial employment and growth inputs in place in our country.

The laborers are divided into 3 categories: unskilled, trained and specialized. The bulk of the laborers here is 'unskilled' and facilitate in masonry work. The trained laborers are masons and have higher rank during this hierarchy. The specialized laborers are those doing tasks like flooring, building and marble work for change of state.

A construction employee could be a worker utilized in labour of the physical construction of the designed atmosphere and its infrastructure. Construction employees work on construction sites. They're liable for variety of on-the-spot tasks, like removing dust, construction system, loading and unloading building materials, and aiding within operation significant instrumentation.

2. Construction industries in Kerala

Construction Sector in Kerala provides employment to the largest proportion of workers from outside the state. The sector was constituted of large-scale civil engineering projects commissioned by the central and state governments, construction of malls, apartment complexes, convention centres, hospitals, factories and

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A Study on Customer Satisfaction of Electric Scooters with Special Reference to Women Customers in Urban Areas

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Abstract:

India is a land of traditions and customs. These customs and traditions loaded society have a strong control over women and their living conditions. For a long time, women were forced to be at home and restricted to lead a home maker life by assisting family members and rising the children. Thanks to the reformers and education activists along with government initiatives more women started going to schools, colleges and work. Finally modern cities have record number of women going to work. These working women as well as the home makers depend more on the personal transportation rather than the public or group transportation options. As the Women started depending on the two wheelers for their personal as well as official purposes, there is huge rise in demand and consumption of the petrol two wheelers. This has led to a huge pollution addition to the existing air pollution and sound pollution. The innovation of electric scooters has helped a lot to women customers with its easy-to-handle comfort and non-dependence on traditional fuel have really attracted women customers. But there has to be some more knowledge and advancement is due to make the electric scooters a great reliable two-wheeler for women. The researcher wants to throw light on the factors that influence the satisfaction of women two-wheeler users and also lapses in the electric two wheelers which are remaining as a hurdle for its progress in Indian two-wheeler market.

Key Words: Electric Scooters, women customers, Air Pollution, Demand, Consumption

Introduction:

When we compare the female customers with male customers there is huge difference in variety of aspects because the women customers are peculiar and highly influential. If they are satisfied with a particular product, they will definitely talk about that product to friends and family members and also insist them to go for such

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An International Open Access, Peer-reviewed, Refereed Journal

An Analysis On The Role Played By Electric Scooters In Minimizing Urban Pollution

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Abstract: Production and consumption are the two major economic activities which have no end on this planet. As the people's wants are unlimited and endless, every day producers have to find the new ways of production as well as products to satisfy the needs of the mankind. In this process engineering also playing a greater role in production of goods and services directly or indirectly. Every producer and also consumer is aware of the value of inter-generational equity, they cannot bring that ideal into their production ideas and behave responsibly towards the future generations.

Urban population is increasing around the globe. Technology and transportation are the major pulling factors of the rural population to the urban areas. As fuel driven two wheelers are increasing there is a vast necessity to find ways to reduce pollution in urban areas. In that process the first and best innovation is electric scooters which can bring down the pollution caused by the fuel driven two wheelers due to their large-scale emissions like Carbon monoxide (CO).

Electric scooter innovation can pave the way for the reduction of different forms of pollution like air pollution and sound pollution. Air pollution is the major pollution causing the damage to the quality of oxygen and also availability of oxygen. The researcher wants to throw the light on the role of electric scooters in minimizing urban pollution and the need for more awareness in the modern generation about air pollution free transportation along with the necessity to improvement in engineering for future.

Index Terms – Urban-pollution, inter-generational equity, emissions and electric scooter

Introduction:

As the population is increasing every day on the earth, there is a need for their survival by doing some kind of job or profession. Since more people are depending on the agriculture and other allied activities, those who are well educated, semi-educated and skilled labourers along with those who are well versed in trade and commerce migrating to urban areas. This popular migration is causing for the bulging of the cities and scarcity of the resources in urban areas. In the process of continuous effort to meet the needs of both urban population and rural population, production was forced to increase manifold. This production of various goods and services in large scale has led to the highest volume of pollution where not only manufacturing but also consumption of the goods have been causing for the huge pollution of the city and its resources.

Negative consumption externality like usage of petrol bikes, petrol cars etc are causing a major damage to the environment, in turn leading to the negative effect on the people's health and their lifespan.

The best innovation of recent times which is seen so far as the solution to urban pollution is innovation of electric scooter which doesn't need fuel and there are no emissions like carbon monoxide (CO), nitrogen oxides (NOx), and hydrocarbons (HC). Even though there are other challenges with the electric scooters and their performance, regarding the controlling pollution is concerned electric scooter is the best solution to urban air pollution and sound pollution.

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A Study On Sustainable Goat Farming Practices In Namakkal District, Tamil Nadu

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ABSTRACT

Goat farming is a significant agricultural activity in Namakkal district, Tamil Nadu, contributing substantially to the livelihood of small and marginal farmers. Sustainable goat farming practices are essential to ensure the long-term viability of this activity. This article discusses the best practices for sustainable goat farming in Namakkal district, focusing on selecting suitable breeds, improving genetic quality, and implementing breeding programs to enhance productivity and providing high-quality fodder, ensuring adequate nutrition, and promoting grazing with supplementation and implementing regular vaccination, parasite control, and veterinary care to maintain goat health and developing market linkages, improving price fixation, and promoting value-added products. The study further assesses the profitability of goat farming through cost and returns analysis and identifies major constraints faced by farmers such as inadequate veterinary services, fluctuating market prices, feed scarcity, and limited credit availability. The findings indicate that goat farming significantly supplements household income, enhances food and nutritional security, and provides substantial self-employment opportunities, especially for women and marginal farmers.

Sustainable goat farming practices can improve productivity, income, and livelihood security for farmers in Namakkal district. Government support, extension services, and farmers' organizations play a crucial role in promoting these practices.

Key words: Sustainable Goat farming, Long-term viability, Breeding, Feeding, Health management, Marketing, Livelihood security.

INTRODUCTION

Goat farming is an integral part of livestock production in Tamil Nadu, particularly in the Namakkal district. The state's diverse geography and climate make it an ideal location for rearing goats. Sustainable goat farming practices are essential to ensure the long-term viability of this agricultural activity. This article discusses the best practices for sustainable goat farming in Namakkal district, Tamil Nadu.Goat farming in India is a very profitable business with minimum investment. Goat farming can be done in small to large