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Check List of Beetles (Order-Coleoptera) around Region of Khamgaon Dist. Buldana 444303 (India)

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Abstract:

Present study reported that 36 species were from the area of Khamgaon region Dist. Buldana. two sub –order, Adephaga and polyphaga and Eight Families.form Order-Coleoptera Sub-order Adephaga includes family Carabidae which represent 10 species. Sub-order Polyphaga includes seven (7) families namely Scarabaeidae, Coccinellidae, Lampyridae, Chrysomelidae, Meloidae, Elateridae and Cerambycidae. Sub-order Polyphaga represents 26 species out of which family Scarabaeidae contains 16 species, Coccinellidae includes 3 species, Lampyridae contains 2 species, Chrysomelidae 2 species, Meloidae, Elateridae and Cerambycidae represents only one species each. Most diverse family is the Scarabaeidae containing 16 species list diverse families are Meloidae, Elateridae and Cerambycidae including only one species each. Out of two sub-order studied, the dominant sub-order is Polyphaga (26 species) as compared to the sub –order Adephaga (10 species). Study was conducted in the month of July to October-2022 Collection was done at morning and night timing. Study will provide useful information about diversity of beetles in the said area as well as provides baseline data for upcoming researchers and gives wide scope for further study in entomology and biodiversity.

Keyword: Beetles, , Coleoptera, Biodiversity, khamgaon

Introduction

Biological diversity is the variability among the living organisms from all sources including aquatic and terrestrial ecosystems (Harper and Hawksworth, 1994). This includes variety within species, between species, and of ecosystems. Roughly 30 million species are found in the world, only 1.4 million species have been briefly described out of which, about 750,000 species are insects, which shows the percentage of insects in the world. They are either harmful or beneficial, and play an important role in the ecology of majority of ecosystem. Khamgaon area located in the Buldana Districts. Coleoptera (Linnaeus, 1758) is an extremely diverse order of class insecta. They are cosmopolitan and are modified for every possible habitat on our planet, except marine and Polar Regions (Pawara, *et al*., 2014). The beetle shows diversity; they show a great deal of ecological significance. Order coleoptera are very large and dominant order of animal kingdom. Several of them are specialized feeder of animal and plant waste (Banerjee, 2014), about 40% (4, 00,000) of all described insect species are beetles (Hammond, 1992) and approximately 15,088 species were recorded India (Kazmi, 2004) while some are not. Many of species are harmful by eating on some plant parts like flowers, fruits and seeds, which eventually damage our economy. Some beetles are useful, by controlling the populations of serious pests of agricultural plants, examples ladybird feed on aphid colonies, thrips, scale insects and mealy bugs that damage crops (Pawara, *et al*, 2014). In different part of Maharashtra collection of beetles was as done by (Dabhade *et al.* 2012) studied 25 beetles species belonging to the 8 super families and 11 families from Mangrulpir Tahsil, Dist. Washim, Maharashtra. Researcher (Thakare and Zade 2012) noticed 10 species belonging to 6 different families viz. Gyrinidae, Tenebrionidae, Carabidae, Scarabaeidae, Meloidae and

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Determination of heavy metals in spinach by Atomic Absorption Photometric Method

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Abstract

Heavy metals were determined from the leaf of spinach from various market places of Amravati through atomic absorption photometric method. The result showed that maximum concentration of cadmium was about 21.53 ppm and minimum concentration was found 5.8 ppm. Present study showed higher conc. of Cadmium in spinach leaf powder. Highest concentration of calcium was about 125.08 ppm and least concentration was 92.32 ppm, Maximum concentration of sodium was 28.14 ppm and minimum concentration was about 20.91 ppm, highest concentration of lead was about 0.24 ppm and least concentration was 0.02 ppm. Obtained values were compared with available literature.

Keywords: Heavy metals, atomic absorption spectrophotometer,

Introduction

Eating vegetables regularly in diet can have many health benefits by reducing diseases and used to convert fats and carbohydrates into energy **(Mercola, 2014).** Vegetables are important components of the human diet since they provide essential nutrients that are required for most of the reactions occurring in the body **(Gilden, *et al.*, 2010).** Rapidly increasing urbanization and emission of heavy metal contaminated fumes from the industries and vehicles have contribution to agriculture soils and consequently in food chain by deposited on the vegetable surfaces during their production, transport and marketing. Application of wastewater to irrigate agricultural lands is one of familiar practice in suburban and industrial areas in many parts of the world **(Gupta, *et al.*, 2008).** According to chemical properties, heavy metals are elements that reveal metallic properties and are defined based on density, atomic number or atomic weight, chemical properties or toxicity **(Sanchez, 2008)**. Recent reports indicated that heavy metals take driver's seat among the chief contaminants of leafy vegetables. Dietary ingestion of heavy metals infected vegetables may pose serious hazard to human health. Plants can receive these metals from soil by their roots, transport them upwards to their shoots, and finally collect them inside their tissues, although there are large variations among different plant species in terms of metal gathering capacity **(luo, *et al.*, 2011)**. It has been reported that almost half of the means of intake of lead, copper and chromium through food is due to plant origin (fruit, vegetables and cereals) and it sometimes in more than permissible limits within urban areas **(Yebppella, *et al.*, 2011)**. Conversely, nutritional value and consumer reception must be taken into contemplation when vegetables are being considered as food, because vegetables can contain both essential and nonessential elements over a wide range of concentrations **(Chien, *et al.*, 2002).**

Diverse agro climatic conditions of the country permit growing of several vegetables round the year. Uncontrolled irrigation of crops with sewage water leads to the accumulation of some potentially toxic metals in agricultural soil and have very adverse effects on the growth of the plants (Muhammad, *et al.*, 2013). Waste water contains few important plants growth nutrients like potassium (K), zinc (Zn), phosphorus (P), nitrogen (N), and organic solids (Gibbs, *et al.*, 2006). Whereas it is also the prime source of potentially hazardous organic and

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Synthesis of ZnO Nanoparticles by Chemical Precipitation Method

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Abstract:
ZnO nanoparticles were synthesized by a simple cost-effective chemical precipitation method technique using L-histidine as a capping agent. The X-ray diffraction pattern (XRD) has been utilized to investigate various structural parameters of ZnO nanoparticles. XRD pattern confirms purity and phase formation of ZnO nanoparticles. Particle size has been calculated using XRD data and have found to be 24 nm and 19 nm for pure and L-histidine capped ZnO nanoparticles. These nanoparticles have also been characterized by UV-visible (UV-vis) spectroscopy. The blue shift evident from the absorption spectra clearly indicate formation of ZnO nanoparticles.
Keywords: ZnO nanoparticles, X-ray diffraction, UV-visible spectra.

1. Introduction:

Zinc oxide (ZnO), a transition metal oxide material, has been recognized as a promising semiconductor material due to its direct band gap (3.37 eV) and relatively high exciton binding energy (60 meV) at room temperature [1]. With its exceptional physical and chemical properties, this versatile material has great potential for applications in electronics, optoelectronics, spin electronics and sensing devises [2-5]. Several techniques have been used to prepare ZnO nanostructures, including sol-gel, including SILAR [6] sol-gel [7], hydrothermal [8], solvothermal [9], chemical bath deposition [10], pulse laser deposition [11], spray pyrolysis [12], DC magnetron sputtering [13]. Among these synthesis routes, the precipitation approach, compared with other conventional strategies, provides a facile way for low-cost and large-scale production that does not require expensive raw materials and complicated equipment [14]. To avoid agglomeration of the nanoparticles capping agents play important role.

In the present study, we report the synthesis of ZnO nanoparticles using cost-effective and simple chemical precipitation method employing with the biocompatible amino acid L-histidine as a capping agent. Powder X-ray diffractometry (XRD) and UV-visible spectroscopy have been utilized to investigate the structural evaluation and optical properties of as-synthesized ZnO nanoparticles.

2. Experimental:

2.1 Synthesis Of ZnO Nanoparticles

All chemicals used were of analytical reagent grade and used without further purification. Zinc chloride ($ZnCl_2$) AR grade and Sodium Hydroxide pellets (NaOH) AR grade was purchased from Sigma Aldrich, USA while L-histidine was procured from TCI Chemicals, Japan. To begin, stock solutions of 1M $ZnCl_2$, 2M NaOH, and 0.1M L-histidine in double distilled water were prepared in separate beakers.

To synthesized pure ZnO nanoparticles, firstly 10 ml of 1M $ZnCl_2$ was dissolved in 100 ml distilled water and stirred for 30 minutes. Then, 10 ml of 2M sodium hydroxide was added, and the mixture was stirred continuously for 2h at room temperature. L-histidine-capped ZnO

Brief Insights into Synthesis Methods and Applications of Nanostructured Metal Oxides

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Abstract:

Nanostructured metal oxides exhibit unique properties due to their nanoscale dimensions and find versatile applications in catalysis, energy storage, sensing, and environmental remediation. This mini-review presents various synthesis methods of nanostructured metal oxides like sol-gel, hydrothermal, chemical vapor deposition (CVD), etc., discussing their characteristics, advantages, and limitations and highlighting the importance of the hydrothermal method because it is pivotal for precisely controlling the morphology and crystallinity of metal oxide nanostructures. This mini-review also explores applications, emphasizing how synthesis influences nanostructure design and functional properties for advancing innovative technologies.

Keywords: Metal oxide, Nanostructures, Top-down, Bottom-up, Hydrothermal method

1. Introduction

Metal oxides, resulting from metals bonding with oxygen, possess diverse characterstics based on the metal and oxidation state, showcasing electrical, magnetic, and catalytic properties. Manipulating these materials at the nanoscale comes into the realm of metal oxide nanostructures. Nanostructured metal oxides, with their unique properties derived from nanoscale dimensions, have become a focal point in scientific exploration, offering vast potential across diverse applications. These materials possess distinctive physical, chemical, and mechanical characteristics at the nanoscale, revolutionizing materials science, catalysis, energy storage, sensing technologies, and environmental solutions. Their manipulation at the nanoscale marks a significant shift in materials science, introducing novel functionalities and customizable traits that were previously unattainable in bulk materials [1-3].

Nanostructures involve materials or structures within 1-100 nanometers, classified by their dimensions. Zero-Dimensional (0D) nanostructures like nanoparticles and quantum dots confine all dimensions. One-Dimensional (1D) structures like nanowires have two larger dimensions and one nanoscale dimension. Two-Dimensional (2D) nanostructures like graphene possess two nanoscale dimensions. Three-Dimensional (3D) nanostructures exhibit nanoscale features in all dimensions [4-5].

The synthesis of various nanostructures emerged from interdisciplinary studies, evolving with technological advances. Early observations on atomic behaviors led to deliberate fabrication, gaining importance from the late 20th to 21st centuries. Synthesis methods of nanostructures can be classified on their fundamental approach to fabrication. These methods can be classified into two primary categories: bottom-up and top-down approaches:

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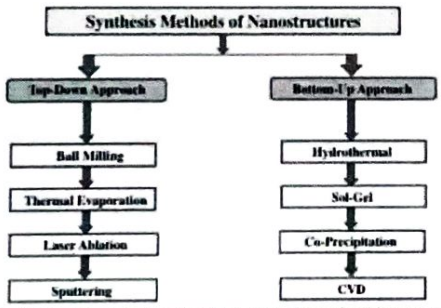

Fig. 1 Classification of synthesis methods of metal oxide nanostructures

Top-Down Approach: Ball milling involves mechanical grinding or milling processes that break down bulk materials into nanoparticles, offering scalability and control over particle size. Thermal evaporation utilizes high temperatures to vaporize materials, condensing them onto substrates to create thin films or nanostructures, offering high purity and precise control over film thickness. Laser ablation employs high-energy laser pulses to vaporize target materials, generating nanoparticles or thin films with controlled sizes and compositions, which is particularly useful for creating unique nanostructures and exotic materials. Sputtering involves bombarding a target material with high-energy ions or atoms, ejecting atoms from the target to deposit thin films with excellent adhesion and uniformity.

Bottom-up Approach: Hydrothermal Synthesis involves the synthesis of materials in a high-pressure, high-temperature aqueous solution, enabling controlled growth of various nanostructures. The sol-gel method fabricates materials from a colloidal solution, notably employed for metal oxides and ceramics, allowing precise control over composition and structure. Co-precipitation methods create nanoparticles by precipitating solutes from a solution, offering simplicity and scalability. Chemical Vapor Deposition facilitates the deposition of thin films or nanostructures through chemical reactions in a gas phase, ensuring high precision and uniformity in structure and composition. One of these methods, the hydrothermal method is essential for precisely shaping metal oxide nanostructures, crucial for optimizing their properties. This technique enables tailored designs, enhancing applications in catalysis, energy storage, and environmental solutions. Its precision in nanostructure control drives advancements in technology by creating high-performance materials with specific functionalities. [6-8].

Both bottom-up and top-down approaches in nanomaterial synthesis present distinct advantages and limitations. Bottom-up methods offer precision at the nanoscale, enabling controlled assembly of atoms or molecules to create nanostructures with unique properties,

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Role of Internet of Things in Disease of Pate and Remote Monitorning System

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Abstract:

This article explores the transformative role of the Internet of Things (IoT) in revolutionizing healthcare practices, specifically emphasizing its impact on disease management and remote patient monitoring. IoT technologies have paved the way for continuous and real-time patient monitoring, utilizing wearable devices and sensors to collect crucial health data. The integration of IoT in chronic disease management empowers patients and healthcare providers alike, fostering proactive interventions and personalized treatment plans. Remote patient engagement is enhanced through telehealth platforms, reducing the need for frequent hospital visits and facilitating seamless communication between patients and healthcare professionals. The vast amount of data generated by IoT devices allows for advanced analytics and predictive modeling, enabling healthcare providers to identify patterns, anticipate disease progression, and implement preventive measures. As technology continues to advance, the role of IoT in healthcare is set to expand, ushering in an era of connected and data-driven healthcare systems

Keywords: Internet Of Things (Iot), Pate, Wearable Devices, Sensors, Patients, Healthcare, Monitoring,Telehealth.

Introduction:

The Internet of Things (IoT) has emerged as a groundbreaking technology with far-reaching implications across various industries. One of the most promising areas where IoT is making a significant impact is in the realm of healthcare, particularly in disease management and remote patient monitoring. This article explores the multifaceted role of IoT in revolutionizing healthcare, improving patient outcomes and transforming traditional healthcare practices especially on abnormality of head in Warud region.

In the rapidly evolving landscape of healthcare, technological innovations are playing a pivotal role in reshaping traditional practices and fostering a patient-centric approach. Among these innovations, the Internet of Things (IoT) has emerged as a transformative force, promising groundbreaking solutions to longstanding challenges. This article delves into the profound impact of IoT on disease of Pate management and remote patient monitoring, exploring how interconnected devices and advanced technologies are ushering in a new era of healthcare delivery.

Objectives:

1. Analyze Remote Patient Engagement through Telehealth.
2. Investigate the Utilization of Data Analytics and Predictive Modeling.
3. Consider Future Trends and Developments
4. Examine the Impact on Patient Outcomes.

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A Study on Covid -19 Classification From X-Ray Images With Machine Learning

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ABSTRACT:

The emergence of novel variants of the SARS-CoV-2 virus, such as Omicron and Delta, has heightened the urgency for efficient and accurate diagnostic tools. This research proposes a novel approach for automated detection of COVID-19 variants using X-ray images and deep learning techniques. The study leverages a comprehensive dataset encompassing X-ray images from patients infected with different SARS-CoV-2 variants, with a particular focus on the highly transmissible Omicron and Delta variants.

The deep learning model architecture is designed to capture unique radiological features associated with each variant, enabling precise identification. Transfer learning is employed with state-of-the-art pre-trained models to leverage learned representations from diverse datasets. The model's training process is meticulously optimized, considering the challenges posed by variant-specific imaging patterns.

The proposed system undergoes rigorous evaluation on a diverse and well-annotated dataset, encompassing cases of Omicron, Delta, and other prevalent strains. Performance metrics including accuracy, sensitivity, specificity, and F1 score are used to assess the model's effectiveness in distinguishing between different variants. Furthermore, the study delves into the interpretability of the model's decisions, employing attention mechanisms to highlight the regions within X-ray images that contribute significantly to variant classification. This not only enhances diagnostic transparency but also aids in understanding the radiological nuances associated with distinct variants.

The findings hold promise for timely and accurate identification of emerging variants, thereby facilitating targeted public health interventions and clinical management strategies. Additionally, the model's interpretability enhances its acceptability among healthcare professionals, fostering trust in its clinical applications.

Keywords: MATLAB, Deep learning model , X-ray imaging , COVID-19, Omicron & Delta variants etc.

INTRODUCTION:

The ongoing battle against the COVID-19 pandemic has been marked by the evolution of the SARS-CoV-2 virus, giving rise to distinct variants with unique genomic signatures. Among these, the Omicron and Delta variants have emerged as significant challenges due to their increased transmissibility and potential for immune escape. Rapid and accurate identification of these variants is crucial for effective public health responses and clinical management.

Traditional diagnostic methods often face limitations in discerning between different viral strains promptly. This research focuses on advancing the state-of-the-art in COVID-19 variant detection by harnessing the power of X-ray imaging and deep learning, implemented using MATLAB as the development environment. The utilization of neural networks, a subset of deep learning models, offers a promising avenue for automating the identification of

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AGNIRAKSHAK: Raspberry Pi based fully Robust fire Sensing & Protection System

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ABSTRACT

Sensing and controlling system is having very vast applications in various fields. It used advanced technology such as embedded or Microcontroller based instruments. Now-a days the cases of fire catching have been increased a lot. The places like Colleges, Hospitals, Marriage halls, go-downs are usually got prone to such fire incidences as per statistics. AGNIRAKSHAK is a model for fire sensing as well as to control that fire through a completely robust electronic system. This is able to detect the fire & take the preventive actions accordingly. The Raspberry Pi based model consist of a Flame sensor, Smoke Sensor ,Temperature Sensor, Alert Sound Buzzers, Automatic sprinkler (water pour) system, GPS with GSM module for sending location and a help message to nearby fire brigade agencies and a physical rescuing outlets system. This "Fully robust fire detection & protection electronic system" has been designed in such a manner referencing recent fire catch incidences in mind. When the flame sensors sense the flame the Raspberry Pi module triggers the connected circuits due to which power within the place gets cutoff, Buzzers starts alerting about fire, water sprinklers gets activated, help message with location will get send to nearby fire brigade agencies. Ladders comes in ready to use position fixed at the windows.

Keywords: Raspberry Pi, Sensors, Fire etc

INTRODUCTION

The risk of fire in urban areas has increased over the years and the rise in cost of fire losses are increasing at a greater rate than the measures devised to control them. Human negligence also plays a key role in such accidents. The proper laws should be in place to tackle the issue. As the country is facing many hazards like biological, chemical, knowing about fire incidents and fire safety is important.

DESCRIPTION OF PROBLEM

The use of fire are everywhere in the world , Sometimes due to some natural as well as man-made error the place meet with the fire accidents. The sources of fires are expressed approximately in terms of percentages.