



## Janki Devi Bajaj Government Girls College, Kota



### Self-Study Report

#### Criterion -3

#### 3.3.1. Number of research papers published per teacher in the Journals notified on UGC care list during the last five year

S. N.		Content	Page No
1	Jan 2022-Dec 2022	Number of research papers published per teacher in the Journals notified on UGC care	1-27

### 3.3.1. Number of research papers published per teacher in the Journals notified on UGC care list during the last five year

Jan 2022 to Dec 2022




REVIEW

Egyptian Journal of Agricultural Research



Plant Science

## Applications of Metal Nanoparticles in the Agri-Food sector

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### ABSTRACT

The application of smart and active packaging, nano sensors, nano pesticides, and nano fertilizers, as well as the rapid development of nanotechnology, has expedited the transformations of traditional food and agriculture industries. Metal nanoparticles have been produced for a variety of applications, including food quality and safety, crop development, and environmental monitoring. The most challenging issues and potential opportunities in the food and agriculture sectors are discussed in this chapter, as well as the most recent trends in nanotechnology from research findings. We focused on the possibilities for biosynthesized and bio-inspired nanoparticles to be used in sustainable development. Nanotechnology is used in agriculture to provide agrochemicals and nutrition, as well as insecticides, nano-scale carriers, smart packing, nanosensors, and nutritional deficiency monitoring. Nanomaterials have a broad range of applications in the food industry, including production, storage, packaging, bioavailability, nutrient conductivity, and food safety. Nanomaterials are likely to become more widely used in agriculture in the future, increasing human and environmental exposure to these materials.

**Keywords:** Nanotechnology, Nanomaterials, Metal nanoparticles, Applications, Agri-food sector

### INTRODUCTION

Nanotechnology is concerned with nanoparticles with at least one dimension of 1 to 100 nanometers. Nanotechnology has a wide range of applications, and synthesizing functional nanomaterials for Agri-food applications from biogenic resources is universally recognized as a sustainable, human- and animal-safe approach. (Sampathkumar and colleagues, 2020). With the advent of equipment to monitor and analyze nanomaterials, they have infiltrated every part of human existence, starting with fabrics (Rivero et al., 2015) and progressing to more serious uses in the agri-food, vehicle, biomedical, and wastewater industries. Nanoparticle application and utilization provide superior qualities not seen at larger size scales, and with the emergence of nanotechnology, this is becoming more ubiquitous (Global Industry Analysts Inc., 2019). With a rapidly growing global population, it is projected that food demand will skyrocket, putting enormous strain on the agri-food business. (Adisa et al., 2019) Nanotechnology has been employed in food processing and preservation, crop productivity, animal feeding, and environmental monitoring since 2003 when it was first introduced into the agricultural and food industries (He et al., 2019).

Biosynthesized nanoparticles offer immense potential in green technology for enhancing the quality of life through applications in the Food and Agriculture fields such as improved food quality and safety, reduced agricultural inputs, and improved nanoscale nutrient absorption from the soil. Agriculture, a smart delivery system for agrochemicals such as fertilizers and pesticides, early detection of diseases in food materials, system integration for food processing, packaging, monitoring, and natural reservoir management all have growth potential. (Ali et al., 2021; Rawat et al., 2018). All of these factors have an impact on the production of food and agricultural-based products, which are key driving factors. This nanomaterial is expected to become an important agenda item in the not-too-distant future, with significant benefits for consumers, producers, farmers, ecosystems, and society (Kaphle et al., 2018; Baker et al., 2017). Scientists and professionals are looking for alternate, environmentally safe, and intensive approaches to control plant diseases (Parthiban et al., 2019). Metal nanoparticles as antimicrobial elements have grown increasingly popular as a substitute for chemical pesticides, thanks to technological advancements that have made their products more cost-effective (Malandrakis et al., 2019; Sahadan et al., 2019). Nanotechnology's new role as a precision agriculture technique should boost crop yields while lowering leaching and emissions (Duhan et al., 2017). Nanoparticles for the controlled release of nutrients, insecticides, fertilizers, and other uses have been appraised as a positive influence of nanotechnology in the agri-food business (Yata et al., 2018; Rawat et al., 2018; Singh et al., 2019).

Metal/Metal oxide nanoparticles offer unique features that make it easier to produce durable and multifunctional materials for a variety of applications. Because of their unique properties that improve adsorption by plants, disease management, and pathogen detection metal nanoparticles have the potential to transform the food and agriculture industries (Abd-Elsalam et al., 2021). Nanoparticles have a unique surface and characteristics due to their unique design. Metal oxide nanoparticles, magnetic nanoparticles, gold nanoparticles, mesoporous silica nanoparticles, quantum dots, and carbon nanomaterials have all been made (Wang et al., 2016 a). Metal oxide nanoparticles, such as copper, gold, silver, aluminum, zinc oxide, and titanium oxide, have gotten a lot of interest in recent studies as prospective alternatives to chemical antimicrobials. Different metal nanoparticles can inactivate a wide variety of Gram-negative and Gram-positive

# Experimental Investigation on Green Synthesis of Bimetallic Nanoparticles by Using Plant Extract: A Review

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## Abstract

The use of viable cells in the green production of nanoparticles (NPs) is a promising and unique method in nanotechnology. The purpose of this work is to provide a comprehensive dissection on the use of various extracts of plant parts in the synthesis of bimetallic nanoparticles (BMNPs). In comparison to the physical and chemical methods, green nanotechnology based on biosynthesis has recently attracted a lot of attention. Biosynthesis has been discovered to be more energy-efficient and capable of avoiding the usage of toxic chemicals. Several strategies have recently been employed to boost the productivity of nanoparticles with varying sizes, shapes, and stability. The shape, size, surface charge, and surface area of NPs have all been associated with their mechanical, optical, magnetic, and chemical properties. The impact of various reaction conditions such as pH, plant extract concentration, reaction temperature, and ionic ratio on the synthesis of bimetallic nanoparticles is also discussed to provide a thorough knowledge of how these variables affect the development of bimetallic nanoparticles. Different techniques are used to detect and analyze biosynthesized NPs, such as UV-vis spectroscopy, FT-IR, TEM, SEM, AFM, DLS, XRD, zeta potential studies, and so on. The green method of NP synthesis can be used in a variety of biotechnological sectors.

## Keywords

Green synthesis, Bimetallic nanoparticles, Experimental investigation, Characterization techniques

## Introduction

Nanoscience is an interdisciplinary field of study that encompasses physics, chemistry, medicine, and materials science. Nanotechnology is sometimes referred to as a general-purpose technology since it will have a significant impact on practically every aspect of society and industry in its advanced form [1]. Norio Taniguchi of Tokyo University of Science coined the term "nanotechnology". The prefix 'Nano' derives from a Greek term that means "dwarf" and refers to objects that are one-billionth in size [2]. The study of structures and molecules in the nanometre range of 1-100 nm is known as nanotechnology [3]. Nanotechnology is a type of technology that is employed in practical applications such as devices. Nanoparticles are classified into many categories based on their size, shape, physical, and chemical characteristics. Metal nanoparticles, carbon nanoparticles, semiconductor nanoparticles, ceramic nanoparticles, polymeric nanoparticles, and lipid-based nanoparticles are just a few of them. Metal nanoparticles have unique properties compared to their bulk metal counterparts, which have a de-graded density of energy state and a high surface-to-volume ratio, boosting their

## *Biological Synthesis of Metal Nanoparticles: A Review*

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### **Abstract**

The utilization of biological cells in the biosynthesis of nanoparticles (NPs) is a promising and novel nanotechnology strategy. The goal of this research is to utilize different plant extracts in the manufacture of metallic nanoparticles (MNPs). Green nanotechnology based on biosynthesis has recently gained a lot of interest in compared to physical and chemical techniques. Biosynthesis has been found to be more energy efficient and capable of eliminating the need of harmful chemicals. Recently, several ways have been used to increase the productivity of nanoparticles of various sizes, shapes, and stability. The form, size, surface charge, and surface area of NPs have all been connected to their mechanical, optical, magnetic, and chemical capabilities. The effects of various reaction conditions on the synthesis of metallic nanoparticles, such as pH, plant extract concentration and, reaction temperature is also investigated in order to gain a thorough understanding of how these factors affect the formation of bimetallic nanoparticles. Biosynthesized NPs are detected and studied using UV–vis spectroscopy, FT-IR, TEM, SEM, AFM, DLS, XRD, zeta potential investigations, and other techniques. The environmentally friendly approach of NP synthesis can be used to a range of biotechnological fields.

**Keywords:** Biological synthesis, Nanotechnology, Metal nanoparticles, Experimental investigation

## Experimental Investigation on Green Synthesis of FeNPs using *Azadirachta indica* Leaves

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### Abstract

In nanotechnology, developing an environmentally friendly method for synthesizing iron nanoparticles (FeNPs) is an important aspect. According to recent studies, the use of secondary metabolites from plant leaf extract has recently emerged as a novel technology for synthesizing various nanoparticles. The leaf extract of *Azadirachta indica* was used to synthesize iron nanoparticles in this research. The effects of reactant concentrations, reaction temperature, and pH of the solution on the synthesis process of iron nanoparticles were studied. A UV-Visible Spectrophotometer that analyzed absorbance spectra was used to monitor the formation of iron nanoparticles in dispersion. Scanning Electron Microscopy (SEM) and Transmission Electron Microscopy (TEM) characterized the morphology of iron nanoparticles, and results reveal the particles are spherical with an average size of 48 nm. The optimum conditions for synthesis are as follows: 15 % leaf extract,  $[\text{FeCl}_3] = 1.0 \text{ mM}$ , pH 6.0, and temperature 60 °C. The FTIR technique confirms that plant biomolecules induce the reduction of  $\text{Fe}^{3+}$  ions to FeNPs and act as a capping and stabilizing agent. Therefore, they have good stability for various applications.

**Keywords:** Green synthesis; *Azadirachta indica*; Iron nanoparticles; Experimental investigation.

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### 1. Introduction

Iron nanoparticles (FeNPs) are among the most promising metallic nanoparticles for various applications due to their reactivity and high surface area to volume ratio [1]. Several physical and chemical methods are used to synthesize iron nanoparticles, such as co-precipitation [2], sol-gel [3], hydrothermal [4], micro-emulsion [5], and sonochemical method [6]. The physical technique includes high energy, pressure, and temperature intake, while the chemical technique requires dangerous and harmful chemicals that lead to environmental contamination [7]. Research is focused tirelessly on achieving a green nanoparticle synthesis process that is easy, efficient, and accurate. Several species serve as safe, environmentally friendly, and green precursors to develop stable and well-defined functionalized nanoparticles. [8]. Biosynthesis of nanoparticles using microorganisms and

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## Restoration of Forests: Human Concern

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### ABSTRACT

Human depends upon the forest for their day-to-day need. The increasing population has caused the over-exploitation of natural forest resources. Initially, the rate of forest exploitation was balanced by the rate of natural restoration but in the last few centuries due to the population explosion and increased greed of humans, the rate of deforestation is far more than the rate of restoration, which results in the degradation of forests globally. Forest degradation is followed by many consequences including unavailability of forest goods and services, reduction in pollutant absorption by forests which in turn accelerate global warming, climate change, etc. There is an urgent need to conserve what we have left with and restore what we have lost otherwise the outcomes of human greed will be drastic.

Forest restoration is the process of improving the health, productivity, and array of life of a forest and re-establishes the integrity of the ecosystem. There are usually 4 strategies of restoration used according to the type of ecosystem and level of degradation, these are rehabilitation, reconstruction, reclamation, and replacement. Principles involved in restoration are ecological (benefit the environment), economical (economically support the community), and community-based (enhance the community values like integrity, etc.). Restoration varies from site to site, according to the environment and species present in the degraded ecosystem, it is a normal belief that species with larger seed sizes can withstand stress conditions, and tree legumes form the excellent primary introduction subjects in such areas due to their nitrogen-fixing ability. The process of restoration involves multiple steps and for a successful restoration project implementation of each step should be careful. As with any other project, restoration has its challenges like fund availability, exotic species, lack of support and awareness, etc.

**Keywords-** Restoration, degradation, reference species, monitoring.

### I. INTRODUCTION

Human needs are served by forests for an indefinite time in form of food, timber, fibers, etc. and now the awareness of society's dependence on the forest is much stronger than before. Despite all this awareness, the unsustainable use of forest resources led us to the vast degradation of forests. It is estimated that more than 2 billion hectares of forest area are degraded worldwide

and require restoration (Lindenmayer, et al., 2012). There are many social factors responsible for degradation including, economic, demographic, technical, and governance (Kanninen, et al., 2007). Although 12% of the total global forest is reserved and expected to be repositories of biodiversity there is no forest in the world left without human disturbance, even our so-called reserve forest is often degraded and threatened by encroachment. Degradation can occur in degrees; for example, land may be classed as marginal, fragile, or degraded (Hudson & Ayala, 2006); or ecosystems as degraded, damaged, or destroyed (Society of Ecological Restoration, 2004). The loss of forests leads us to the loss of ecological services like biodiversity, carbon sequestration, and protective and productive functions. Loss of forest cover also accelerates the process of climate change, global warming, and the greenhouse effect because forests or trees are known to absorb responsible pollutants. So, conservation of what have we left with and restoration of what we have lost should be our utmost priority in the current situation.

### II. WHAT IS RESTORATION?

No forest in the world remains completely unaffected by humans, the effects imposed by humans are either direct like overexploitation, invasions, etc. or indirect like impacts of climate change, change in weather patterns, etc. In both scenarios, nature is the one that suffers. WWF defines forest restoration as "the process of improving the health, productivity, and array of life of a forest and is a complex undertaking that can never fully bring back the original forest" (WWF, n.d.). It can also be defined as "actions to re-instate ecological processes, which accelerate recovery of forest structure, ecological functioning and biodiversity levels towards those typical of climax forest" (Elliott, et al., 2014). Forest restoration can also be defined as accelerating the regeneration process by removing and overcoming the hurdles to natural forest regeneration (Lamb, 2011; Holl, 2012).

Generally, the term restoration is being confused with replantation but in reality, restoration is an umbrella covering replantation, conservation of remnant vegetation, biodiversity conservation, and economy; hence IUCN introduced a new concept of FLR i.e., Forest landscape restoration. IUCN defines FLR as an



## Effect of Physico-chemical Properties on Spore Density and Root Colonization of Mycorrhizal Fungi in Industrial Wastelands in Kota, Rajasthan

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### Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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### ABSTRACT

This study was conducted in selected industrial waste dump sites in the Kota district of Rajasthan, India to investigate the impact of various edaphic factors on spore density and root colonization of arbuscular mycorrhizal (AM) fungi. The current research shows that AMF root colonization rates were insignificantly negatively correlated with EC, soil temperature, P, K, Fe, Cu, Zn, and Mn but significantly positively correlated with soil pH, soil moisture, and insignificantly positively correlated with N and OC ( $P < 0.05$ ). Spore density of mycorrhiza was insignificant and negatively correlated with soil moisture ( $P < 0.05$ ), EC, soil temperature, P, K, Fe, Cu, Zn, and Mn but significantly positively correlated with soil pH and insignificantly positively correlated with N and OC. Edaphic factors may influence the root colonization and spore density of mycorrhiza differentially. Except for pH and soil moisture, almost all other parameters have a very insignificant influence on mycorrhizal root colonization and spore density in industrial wastelands.

**Keywords:** Edaphic factors; root colonization; spore density; industrial wastelands.

### 1. INTRODUCTION

Mycorrhiza are obligate symbiotic soil fungi that colonize the roots of the majority of plants

forming an intricate network in the root cortex, regulating community and ecosystem functioning. An Arbuscular Mycorrhizal Fungi (AMF) is a type of mycorrhiza in which the

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## FLORISTIC ANALYSIS OF CERTAIN SELECTED AREAS OF FOREST REGION OF BHAINSRORGARH (RAWATBHATA), RAJASTHAN

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### ABSTRACT

This Study is based on assessment of common and dominant species found in transect line survey, transect survey gives the idea about trees, shrubs, herbaceous species, grasses and weed species of that particular transect area where plotting has been done. Results are justifying the presence of 11 tree species, single grass species, 5 herbaceous species, one shrub species and 4 weed species in the study of given transect lines (I.T 21 and I.T12). Maximum canopy cover found in all the plots never exceeded from 0.5, while herbs and shrubs are not reported in some plots. *Diospyros melanoxylon* Roxb., *Boswellia serrata* Roxb. Ex. Colebr., *Butea monosperma* (Lam.)Taub. and *Anogeissus pendula* Edgew., *Anogeissus latifolia* (Roxb. Ex DC.)Wall. Ex Guill. And perr.) are frequent tree species of the area studied.

Key words: transect line, plotting, abundance, locus map, ecological app etc

### INTRODUCTION

Forest ecosystem consists of its floral and faunal species composition and specifically floral composition contributes the most and prepares the base of food chain and food web. Floristic methods of vegetation description involve the identification of individual species and the assessment of abundance of species. Floristic analysis is important to measure changing pattern of flora, conservation status, and extinction rate of a particular species.

The geological and Ecological varieties zone of the world support various types of floristic composition. This composition of flora of a district distinguishes and ensures plants rich on the systematic way. (Masroor, 2011). The structure, composition, and vegetative functions are most significant ecological attributes of a particular ecosystem, which show variations in response to environmental as well as anthropogenic variables. (Shaheen et al. 2012). For forest management decisions, appraisal of flora species and forest structure is crucial for any meaningful conservation work. (Adeyemi, A. A., Ibe, A. E. and Okedinma, F. C., 2015). The rapid loss in floristic diversity and changing pattern of vegetation due to various biotic and abiotic factors have necessitated the qualitative and quantitative assessment of vegetation. (Sharma et al. 2014). Study of flora contributes in making direct conservation plans for that particular flora and also leads to indirect conservation of related fauna which relies on that flora. Knowledge of different aspects like density, abundance, dominance, frequency, canopy cover etc. gives idea about conservation status, extinction rate, habitat and growth requirements along with factors affecting species composition so that we can distinguish the flora on which we need to put more efforts to conserve.





# **Ecomorphological Studies Of Algal Floristics Of Chambal River At Selected Sites Of Rawatbhata Region(Rajasthan)**

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## **ABSTRACT**

Wetlands areas that are wet during part or year round because of their location in the landscape. About 95 Indian wetlands are included in Asian wetland directory (Scott,1993)

A study was undertaken to analyze the physico-chemical characteristics of water and its effect on algal floristics of the Chambal Riverine wetland including the effects of the human interference in the vicinity of these water bodies.

The present work is a piece of research understanding to know the algal diversity in the area of study and its seasonal and monthly variation in correlation with the physico-chemical parameters.

## **INTRODUCTION**

Phytoplankton like algae are one of the key constituents of aquatic ecosystem that play an important role in sustainability by their ecological interactions with biotic and abiotic factors which is benefited to aquatic life in many ways. Along with ecological and economical benefits algal species are also counted as bioindicators, used in bioremediation and production of biofactors and biomass, despite these uses algal potential is still continue to explore.

A direct correlation has been found between phytoplankton diversity and the physicochemical properties of water body. Qualitative and quantitative studies about phytoplankton are used to assess the quality of water. The algal flora represents a critical link in the food chain and its productivity depends on water quality at a given time (Meshram, and Dhande,2000 , Santharam and Peruma,2003).

Species composition differs with the variations in factors like topography, pollution status of water body, disturbance, variation in biotic and abiotic factors and so on. Current study is undertaken to assess the species richness and evenness in contrast to algal floristics of Chambal river at Rawatbhata.

## **STUDY AREA**

Rawatbhata map with two main sites- jaura and Bhainsenagarh



**Harmful Algal blooms (HABs) and Its Effects on Aquatic Life in Shakambhari Conservation Reserve of Sikar and Jhunjhunu District, Rajasthan**

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**INTRODUCTION**

2 may 2022, after some time there are formed algal bloom that is known as Harmful algal blooms on a pond surface in shakambhari conservation Reserve of Rajasthan. Harmful Algal blooms (HABs.) also known as Red Tides. Some algae can toxic that cause algal bloom and can leads to collapse entire aquatic Ecosystem typically as a result of the transfer of toxins through the food web. Sometimes the direct release of toxic compounds can be lethal to marine animals. These phenomena are caused by blooms of microscopic algae. Non-toxic HABs cause damage to ecosystems, fisheries resources, and recreational facilities, often due to the sheer biomass of the accumulated algae. The term “HABs” also applies to non-toxic blooms of algae which can cause major ecological impacts such as the displacement of aquatic life HABs itat alteration and oxygen depletion in bottom waters. The nature of HABS problem has changed over the last some decades. The resulting economic losses, resources affected, and the number of toxins and toxic species are all increased dominant. Human activities are also affected from Harmful algal blooms because Humans have contributed by transporting toxic species by water and by adding large quantities of industrial, agricultural and sewage effluents to waters bodies. In many urbanized coastal regions these inputs have altered the size and composition of the nutrient elements which has created more favorable nutrient environment for HABS species in shakambhari conservation reserve . The study explain the use of fertilizers for agricultural production represents a large source of nutrients in pond waters that promote some HABs. The diversity in HABs species and their impacts presents a significant challenge to those responsible for the management of coastal resources. Furthermore, HABs are complex oceanographic phenomena that require multidisciplinary study.

## Basic Aspects of *Hibiscus* Plant Tissue Culture and its Commercial

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### ABSTRACT

*At present time Global warming is a major problem on earth. Biotechnology is the use of biology with Technology to make new hybrid variety of plants to solve the problem of global environment. Biotechnology is most useful technique in genetic engineering. This biotechnology makes new genetic variety or a new genome of plant to protect entire ecosystem and environment. Present study deals with Hibiscus Plant tissue culture to commercial production of disease free plants from a single cell or a tissue. There are more than 200 different species of Hibiscus plant in the world which is produced by plant tissue culture. In the formation of plant from tissue culture Hibiscus rosa-sinensis. choose a species to produce many plants but here Hibiscus plantlet face a major problem in transplantation in soil. The transplantation and hardening in soil is unsuccessful due to soil parameters. There are a major problem to plantlet for support the environment of greenhouse due to pH of soil, Humidity, manor and soil nutrition elements.*

**Keywords:** Global warming, Biotechnology, Hibiscus, Plantlet, Environment.

### INTRODUCTION

*Hibiscus* is a genus of flowering plants belongs to Malvaceae family. *Hibiscus* are water-loving plants. They have large leaves and blooms are big and full of moisture themselves. In the tropical areas where *Hibiscus* originated mostly islands or coastal areas and the rainfall is good. Most of *Hibiscus* not growing in the tropical areas, so it need to simulate as much as possible the natural conditions where *Hibiscus* originally developed. Plant tissue culture was a new

methods of plant breeding that developed around the 1950s. Since the conventional breeding techniques could not fulfil the required demand of crops, tissue culture came around as a grand leap in breeding practices. It makes use of parts of a plant to generate multiple copies of the plant in a very short duration. The technique exploits the property of totipotency of plant cell which means that any cell from any part of the plant can be used to generate a whole new plant.

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## Comparative Study of Algal diversity in Shakambari - A Conservation Reserves of Sikar and Jhunjhunu District of Rajasthan

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### ABSTRACT

*Algae are the very diverse group of plant kingdom that is very widely present in size, shape, colour and habitat. Present study deals with diversity of Algal-diversity in Shakambari Region, Sikar and Jhunjhunu district of Rajasthan. The algal diversity survey revealed the presence of 13 species of algae. Among them Chlorophyceae and Cyanophyceae are dominant. The investigation shows that these classes of Algae show all the characters with water parameters. Pond water refers to a standing body of water, this is usually smaller than a lake and may either be man-made or natural. The climate change and human impact will put increasing pressure upon existing protected areas and that much biodiversity conservation will need to take place beyond these reserves. Conservation of biodiversity is necessary for maintaining ecosystem functioning.*

**Keywords:** Algal-diversity, Conservation, Biodiversity, Pond water, Ecosystem.

### INTRODUCTION

The present Research deals with a view to study algal biodiversity of Shakambari conservation Reserves sikar and Jhunjhunu District of Rajasthan, India. The research Work from different two sites of Shakambari Region in the period of January 2022 to March 2022.

During this period of investigation there are 07 species belonged to Chlorophyceae, 06 species belonged to Cyanophyceae, 03 species belonged to

Bacillariophyceae, and 01 species belonged to Euglenophyceae. The members of Chlorophyceae were dominant followed by Bacillariophyceae and Euglenophyceae. Diversity of algae in terms of quantity and quality were observed at all selected sites of Shakambari Region. Unicellular, colonial and filamentous algal forms were reported throughout the period of investigation. The algal genera whose species recorded at all sites of study area.

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## HISTOPATHOLOGICAL CHANGES IN SPLEEN OF MOUSE AFTER RADIATION EXPOSURE

Dr. Jaishree Daverey\*

### ABSTRACT

Small amount of radioactive material released in the environment from coal and nuclear power plants and also from nuclear explosions are also source of radiation exposure to man. Exposure to high doses of radiation can cause nausea and vomiting within few hours whereas low levels of radiation exposure doesn't cause immediate health effects but can increase cancer risks. Ionizing radiation can cause tissue damage by changing the chemical properties of molecules. It produces free radicals which are chemically very active and damage the genetic material of a living cell. The present study was therefore designed to investigate the histopathological changes in spleen of Swiss albino mice after radiation exposure. For the experiment, adult healthy male Swiss albino mice were irradiated at the dose rate ranging from 0.97 Gy/min. to 1.97 Gy/min. The dose was calculated at mid-point by multiplying dose rate and tissue air ratio. Animals were exposed to sublethal dose of gamma radiation from  $Co^{60}$  source. Five animals from each group were autopsied by cervical dislocation at each post-interval of 1, 2, 4, 7, 10, 14, and 28 days. Before autopsy the weight of the animals was also recorded. Five normal mice were also autopsied. After autopsy spleen was taken out, weighed on mono pan electric balance. After recording weight, tissue was fixed in Bouin's fluid for 24 hours for histological studies. Spleen is a radiosensitive tissue and shows reduction in body weight and organ weight ratio reaching minimum till day 10 after radiation exposure. Loss of splenic weight was mainly due to cellular damage, loss of lymphocytes, mitosis and circulatory and humoral disturbances. Most striking histopathological change in the spleen in the present study was the rapid death of lymphocytes. Decrease in the total cell population in the present study may be due to direct killing of small lymphocytes by radiation and due to death of cells in their attempt to divide. During later intervals, the new germinal centers were gradually repopulated and lymphocyte cap begins to surround them. At the end of the experiment, although spleen represented all the normal cell types however, recovery was not complete as far as cell population and cell arrangement was considered.

**Keywords:** Radiation, Spleen, Lymphocytes.

### Introduction

Radiation is the natural part of our environment and every living being on the earth is exposed to this natural background ionizing radiation. Small amount of radioactive material released in the environment from coal and nuclear power plants and also from nuclear explosions are also source of radiation exposure to man. Increasing use of ionizing radiation for diagnostic as well as therapeutic purpose has drawn the attention of many radiobiologists towards undesired adverse effects of such exposures. Exposure to high doses of radiation can cause nausea and vomiting within few hours whereas low levels of radiation exposure doesn't cause immediate health effects but can increase cancer risks. The biological effect of these exposures varies with the type, energy and dose of radiation. Ionizing radiation has sufficient energy to liberate electrons from atoms and thereby ionizing them which further damage the genetic material of a living cell, however, our body cells are efficient enough to repair this damage up to certain levels. One of the well-known consequences of radiation exposure is the changes in blood cell counts. Due to the high sensitivity of blood and blood forming organs to ionizing radiation variations in blood cell count is still considered the most sensitive biological evidences of several disorders or diseases. Changes found in the circulating blood are primarily due to the effect on haematopoietic tissues (1 & 2). A very small dose of radiation to a blood forming organ causes an arrest of the haematopoiesis with changes in peripheral blood.

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## **Food availability and dietary composition of sloth bear (*Melursus ursinus*) in Mukundra Hills Tiger Reserve Kota, Rajasthan.**

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### **Abstract**

The study was carried out in Darrah Wildlife Sanctuary, a region of Mukundara Hills Tiger Reserve. Darrah Wildlife Sanctuary (DWLS) lies in the Hadoti region of Kota district in Rajasthan. The sanctuary lies between 24°37' to 25°2' N Latitude and 75°39' to 76°12' E Longitude. Darrah Wildlife Sanctuary comprises of 250 sq km, the area is divided into two ranges, Kolipura range and Darrah range. The climate of the Sanctuary is subtropical, characterized by long and intense hot summer, with low rainfall and short but acute winter. During study 15 species of plants were identified on which the sloth bears were found feeding upon. In present study 90 scats of sloth bear were collected and were analyzed in the laboratory to identify the food item of bear in the area. The scat analysis revealed that bears in the area fed upon fleshy fruits, insects, honey hives and animal. Food composition of sloth bear shows 14.40% plant parts comprises of fruits, seeds, leaf, flowers, roots and shoots, 71.28% insects consist of red ants, black ants, honey bee and termites, 13.73% other matters such as garbage's, wax, aphids, spiders, cockroaches etc and 0.59% animal matters like hair of unclassified animals.

**Key words-** Sanctuary, fruits, seeds, leaf, flowers, roots.

### **Introduction**

Most bears are opportunistic omnivores. As such, their activities are governed by the availability of food items and dietary components within their habitat. Nutrition plays an important role in the reproductive rate of female bears (Jonkel and Cowan 1971). Sloth bears are one of the largest termite-eaters (up to 175 kg) occurring in lowland India, Bangladesh, Nepal, and Sri Lanka. A significant portion of their diet consists of ants and termites, whereas much of the remainder is fruit (Eisenberg and Lockhart, 1972; Laurie and Seidensticker, 1977; Schaller, 1967).



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## Species composition and habitat characterization of mosquito fauna in Kota and Barmer region of Rajasthan

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### Abstract

The present investigation conducted to determine the diversity of mosquito fauna in two ecologically different regions of Rajasthan i.e., Kota and Barmer. Kota is in the south-eastern region of Rajasthan while Barmer is situated in the western part of Rajasthan. The study was carried out over a period of one year. The adult mosquito was collected by using aspirator, BG -Sentinal trap and the larval stages were collected using ladle and dipping method. Total 1258 species were reported in the Barmer region while 1450 species were reported from the Kota region. The most prevalent species in the Kota and Barmer regions was *Culex quinquefasciatus*.

**Keywords:** Mosquito diversity, kota, barmer, *culex quinquefasciatus*

### Introduction

Mosquitoes (Diptera: Culicidae) are the tiny creatures responsible for various devastating diseases such as dengue, chikungunya, yellow fever, filariasis, encephalitis etc [1]. Currently, India is becoming one of the hotspots of mosquito-vector-borne diseases especially dengue. According to National Vector Borne Diseases Control Program, dengue alone contributes over 8.5 lakh cases and thousands of mortalities in the last five years from India (2015-2020). The management of mosquito-borne diseases transmission mainly depends on the vector control programs. The information about the species prevalence and their habitat ecology are the key determining factors for implementing any vector control strategy. India has diverse environmental conditions facilitates diverse mosquito faunal composition throughout the country [2,3].

The species composition varies depending on the ecological and geographical conditions of the area. For example, *Anopheles stephensi* and *Anopheles culicifacies* are typically known as urban and rural malaria vectors respectively. Besides, *Anopheles dirus*, *Anopheles sudaicus* and *Anopheles fluviatilis* prefers deep woodland, brackish waters, and forests respectively [4]. There are over 3,590 mosquito species globally whereas India exhibits over 410 mosquito fauna [5, 6, 7]. Studies on species composition and diversity of local mosquito population have helped in making efficient management strategies [8]. Such studies can form a baseline for mosquito-borne virus activity allowing monitoring due to variation over time.

Rajasthan lies to the western part of India which exhibits the arid climatic conditions. The present study was carried out in the two ecologically different regions of Rajasthan i.e., Kota and Barmer. Kota comes under the south-eastern area with 700 mm annual rainfall while Barmer located in the western part of the Rajasthan with annual rainfall ranging from 200-300 mm throughout the year.

In the present investigation attempts have been made to gather information about prevalent mosquito fauna in Kota and Barmer region of Rajasthan, India.

### Materials and Methods Study area and sampling

The present study was carried out at Kota and Barmer districts of Rajasthan from January 2021 to December 2021.

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## Scanning electron microscopic studies of mosquitoes (Diptera: Culicidae) eggs: a review

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### ABSTRACT

Mosquitoes (Diptera: Culicidae) have a long evolutionary history as they are thriving on earth from the Cretaceous as per the amber dating. They are also of utmost importance to disciplines like epidemiology, as they are responsible for various diseases, including dengue, chikungunya, malaria, filariasis, zika and yellow fever. This creates an immense need for the proper identification of various known species and their breeding grounds for restricting the spread of diseases caused by them. To accomplish the vector management strategy, the SEM technique is recruited as the eggs of mosquitoes can be utilized for various studies and inclusive of species identification. This article compiles the work in this direction from the year 1991 to 2020.

**Key words :** *Aedes*, *Anopheles*, *Armigeres*, *Culex*, scanning electron microscopy.

### INTRODUCTION

Mosquitoes are the insects belonging to order Diptera under the family Culicidae. Many species of mosquitoes are vectors for various arboviral diseases such as malaria, chikungunya, dengue, Japanese encephalitis, yellow fever, etc. (WHO, 2021). The World health organization (WHO, 2014) reports that about 2.5 billion people in over 100 countries are at risk of dengue infection alone (WHO, 2014). In the 20th century, several other viruses were also isolated from mosquito species and about 100 of those virus species have the potential to cause infection (Gould *et al.*, 2017).

Eggs are one of the reproductive strategies that have been adopted by the animals during evolution. Oviparity is advantageous as it allows the organism to lay in a large number which increases the chance of survival of the offspring and helps the species to maintain itself on the earth. Mosquitoes also have been successful in keeping

their population alive using the same strategy so far. However, the habits of oviposition, morphology and morphometry of the eggs vary considerably from species to species and can be used as a taxonomical aid for identifying the species (Tyagi *et al.*, 2015; Sirivanakam, 1976; Panthusiri, 2005).

Scanning electron microscopy allows us to take detailed surface images, to count particles, to determine size and many more. The surface morphology and morphometrics of mosquito eggs provide various potentially important contributions such as confirmation of species, understanding of species relationship gained from genetic and cytological studies, evolution of the usefulness of egg morphology in species complex, strain identification and although, in provision of detailed description of species at fine structural level of eggs (Suman *et al.*, 2009). The description of mosquito eggs using scanning electron microscopy can also be utilized for marking the breeding grounds for the concerned species and becomes an important tool of epidemiological studies. The present review article synthesized the work from 1991 to 2020, on various studies of mosquito eggs using scanning electron microscopy in different parts of the world.

To accomplish the desired objective a literature survey was conducted from 1991 to 2020 with the

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## RESEARCH ARTICLE

### AMAZINGLY NEGLECTED: DUNG BEETLE THE UNSUNG HERO OF THE ENVIRONMENT

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#### ABSTRACT

Dung beetle feeds on the faecal matter they use the faecal matter for the various purposes like feeding, reproduction, breeding. This divine creature have great social as well as economic importance for us such as nutrient cycling, soil aeration and reduction of carbon dioxide and methane emissions, control of parasites and secondary seed dispersal. They are also important in food webs not only as decomposers but also as prey for birds, bats and other insectivorous animals. But today even after being nature's friend there is lack of awareness and information in people about these beetles. Their population is declining day by day by the human activities such as use of harsh pesticides, insecticides, antibiotics used on crops and cattle for maintaining their population and yield. Even today no proper conservation measures are in force for the conservation of this divine creature and we are losing the natural cleanup crew. Strategies and policies for the conservation should come into implementation in order to conserve this super divine but yet so neglected creature.

## INTRODUCTION

Dung beetles belong to the zoological order Coleoptera (largest order which include beetles and weevils) and family Scarabaeidae. The members of Scarabaeidae (sub family Coprinae) are commonly called as Dung beetles. The majority of dung beetles feed on dung, both in their adult and larval phase. However, many dung beetles feed on a variety of things, including mushrooms, decomposing leaves and other rotting matter. Adult dung beetles have mouth parts which are specially adapted to feed on liquefied material and can break down a dung pad very efficiently by burying the dung underground to use when breeding. On the basis of behavior of handling dung, they can be classified into three categories-The Rollers which remove the balls of dung and roll it to tunnel away from dung pile. The Dwellers which burrow lay eggs and feed with in it or just below fresh dung piles. The tunnelers which dig tunnel below dung pile, move dung into the tunnel and lay eggs. In size ranges from 2mm (0.1 inch) to 60mm (2.5 inches). The front legs have serrated edges which they used for digging tunnels. Their body color ranges from black to brown to red and can have metallic appearance. Seasonal activity in dung beetles is determined by factors like temperature, rainfall, resource availability and life history strategies. Dung beetle activity is strongly influenced by rainfall seasonality. Rainfall determines the quality and quantity of dung, which is the primary source of food for most dung beetle, affects the reproductive performance of dung beetles, provides humidity to the soil and triggers the emergence and the onset of activity in the beetle species.

Dung beetle activity is greatest during moist and minimal during dry periods and abundance of scarab beetles increases strongly after heavy rainfall. Majority of dung beetle species that exhibit environmentally induced seasonality are active during favorable periods. Dung beetles play economically major and vital role in our ecosystem. They are often called as natural cleanup crew because they feed on dung (pastures), breakdown it into smaller balls and use it for housing and as food for their young ones and thus remove the dung pile from soil but while doing so they left behind fertilizer and that's how they do their contribution in increasing soil fertility as well as in nutrient recycling and that's why they are called as friend of farmer. At the same time they also destroy the breeding grounds of parasites which uses dung to lay egg, these parasites get their nourishment from moisture present in dung but the activities of dung beetles absorb all water present in dung and makes it dry and eventually this leads to the death of parasite's egg and that's how they also prevent disease transmission in domestic as well as wild animals.

**Life history cycle:** A pair of dung beetles (a male and a female) may work together, digging a nest to create a burrow beneath the dung pad. The dung is taken into the burrow in either a ball or an irregular mass. The female lays her eggs in the burrow. The eggs hatch into larvae, which feed on the dung surrounding it. Female digs while male helps haul soil from tunnel, female lays one egg in each ball and seal the brood ball followed by sealing of tunnel.



# Impact of Disasters and Climate Change on Agricultural Production and Food Security

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**ABSTRACT:** A new report released by the Food and Agriculture Organization (FAO) shows that the increasing frequency and intensity of extreme weather disasters such as floods, droughts and megafires as a result of climate change is having a devastating effect on food security and livelihoods. The report highlights the need for stronger disaster risk reduction policies and intensified efforts to build resilience to the adverse impacts of climate change to ensure agriculture's crucial role in achieving a sustainable future. According to the report, the annual occurrence of disasters is now more than three times that of the 1970s and 1980s as a result of our warming climate. Relative to agriculture, industry, commerce and tourism taken as a whole, on its own agriculture absorbs the disproportionate share of 63% of impact from disasters, with the least developed countries (LDCs) and low- and middle-income countries (LMICs) bearing the major brunt of these scourges. Thus, between 2008 and 2018, the impacts of natural disasters cost the agricultural sectors of developing country economies over USD 108 billion in damaged or lost crop and livestock production. Such damage can be particularly detrimental to livelihoods of smallholder and subsistence farmers, pastoralists, and fishers. Over the analyzed period, Asia was the most hard-hit region, with overall economic losses adding up to a staggering USD 49 billion, followed by Africa at USD 30 billion, and Latin America and Caribbean at USD 29 billion.

**KEYWORDS:** climate change, disaster, food security, agriculture, production, livelihoods, farmers, global warming

## I. INTRODUCTION

"The upheaval set in motion by COVID-19 may push even more families and communities into deeper distress," said FAO Director-General QU Dongyu in the foreword to the report. "Disaster impact is pervasive and requires immediate efforts to better assess and understand its dynamics, so that it may be reduced and managed in integrated and innovative ways. The urgency and importance of doing so have never been greater". [2] The report identifies drought as the single greatest culprit of agricultural production loss, followed by floods, storms, pests and diseases, and wildfires. Over 34% of crop and livestock production loss in LDCs and LMICs is traced to drought, costing the sector USD 37 billion overall. Drought impacts agriculture almost exclusively. The sector sustains 82% of all drought impact, compared to 18% in all other sectors. Crop and livestock pests, diseases and infestations have also become an important stressor for the sector. Such biological disasters caused nine percent of all crop and livestock production loss in the period from 2008 to 2018. [3] The potential threat of disasters of this category was rendered evident in 2020 when huge swarms of desert locusts ravaged across the Greater Horn of Africa, the Arabian Peninsula, and Southwest Asia, destroying crops and jeopardising food security. Meanwhile, the COVID-19 pandemic is placing an additional burden on agri-food systems exacerbating existing, systemic risks with cascading effects on lives, livelihoods, and economies worldwide. Disasters extend beyond the economic realm having deleterious consequences for food security and nutrition. For the first time ever, this edition of the FAO report converts economic losses into caloric and nutrition equivalents. For example, it estimates that crop and livestock production loss in LDCs and LMICs between 2008 and 2018 were equivalent to a loss of 6.9 trillion kilocalories per year. This equals the annual calorie intake of seven million adults. In Latin America and the Caribbean, disaster impacts during that same time frame convert to a loss of 975 calories per capita per day, accounting for 40% of recommended daily allowance, followed by Africa (559 calories) and Asia (283 calories). [1]

Investing in resilience and disaster risk reduction, especially data gathering and analysis for evidence-informed action, is of paramount importance to ensure agriculture's crucial role in achieving a sustainable future. FAO's report argues. Holistic responses and cross-sectoral collaboration are key in the disaster response. Countries must adopt a multi-hazard and multi-sectoral systemic risk management approach to anticipate, prevent, prepare for and respond to disaster risk in agriculture. [4] Strategies need to integrate not only natural hazards, but also anthropogenic and biological threats, such as the COVID-19 pandemic, and must be based on an understanding of the systemic nature and



# Impact of Chemical Pesticides on Environment

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**ABSTRACT:** The environmental effects of pesticides describe the broad series of consequences of using pesticides. The unintended consequences of pesticides is one of the main drivers of the negative impact of modern industrial agriculture on the environment. Pesticides, because they are toxic chemicals meant to kill pest species, can affect target species, such as plants, animals and humans. Over 98% of sprayed insecticides and 95% of herbicides reach a destination other than their target species, because they are sprayed or spread across entire agricultural fields.[1] Other agrochemicals, such as fertilizers, can also have negative effects on the environment. The negative effects of pesticides are not just in the area of application. Runoff and pesticide drift can carry pesticides into distant aquatic environment or other fields, grazing areas, human settlements and undeveloped areas. Other problems emerge from poor production, transport, storage and disposal practices.[2] Over time, repeat application of pesticides increases pest resistance, while its effects on other species can facilitate the pest's resurgence.[3] Alternatives to heavy use of pesticides, such as integrated pest management, and sustainable agriculture techniques such as polyculture mitigate these consequences without the harmful toxic chemical application. Environmental modelling indicates that globally over 60% of global agricultural land (~24.5 million km<sup>2</sup>) is "at risk of pesticide pollution by more than one active ingredient", and that over 30% is at "high risk" of which a third are in high-biodiversity regions.[4][5] Each pesticide or pesticide class come with a specific set of environmental concerns. Such undesirable effects have led many pesticides to be banned, while regulations have limited and/or reduced the use of others. The global spread of pesticide use, including the use of older/obsolete pesticides that have been banned in some jurisdictions, has increased overall.[6][7]

**KEYWORDS:** pesticides, chemical, environment, biodiversity, toxic, human, management, agriculture, pollution

## I. INTRODUCTION

After the end of World War I, the United States shifted its industries from the wartime production of chemicals to synthetic agriculturally used pesticide creation, using pyrethrum, rotenone, nicotine, sabadilla, and quassin as precursors to the expansive usage of pesticides in place today.[8] Synthetic pesticides proved cheap and effective in killing insects, but garnered criticism from NGOs concerned about their effect on human health. In the years directly following World War II rose the creation and use of Aldrin (now banned in most countries), "dichlorodiphenyl trichloroethane (DDT) in 1939, Dieldrin,  $\beta$ -Benzene Hexachloride (BHC), 2,4-Dichlorophenoxyacetic acid (2,4-D), Chlordane and Endrin. While concern for ecotoxicology began with acute poisoning events in the late 19th century, public concern over the undesirable environmental effects of chemicals arose in the early 1960s with the publication of Rachel Carson's book, *Silent Spring*. Shortly thereafter, DDT, originally used to combat malaria, and its metabolite were shown to cause population-level effects in raptorial birds. Initial studies in industrialized countries focused on acute mortality effects mostly involving birds or fish.[9] However, true data on pesticide usage remain scattered and/or not publicly available, especially worldwide (3). Some scholars argue the common practice of incident registration is inadequate for understanding the entirety of effects.[9] Today, over 3.5 billion kilograms of synthetic pesticides are used for the world's agriculture in an over \$45 billion industry.[10] Current lead agrochemical producers include Syngent (ChemChina), Bayer Crop Science, BASF, Dow AgroSciences, FMC, ADAMA, Nufarm, Corteva, Sumitomo Chemical, UPL, and Hupont Life Sciences. Bayer CropScience and its acquisition of Monsanto led it to record profit in 2019 of over \$10 billion in sales, which herbicide shares growing by 22%, followed closely by Syngenta.[11] In 2016, the United States consumed 322 million pounds [CONVERT] of pesticides banned in the EU, 26 million pounds [CONVERT] of pesticides banned in Brazil and 40 million pounds of pesticides banned in China, with most of banned pesticides banned staying constant or increasing in the United States over the past 25 years according to studies.[12] Since 1990, research interest has shifted from documenting incidents and quantifying chemical exposure to studies aimed at linking laboratory, mesocosm and field experiments. The proportion of effect-related publications has increased. Animal studies mostly focus on fish, insects, birds, amphibians and arachnids.[9] Since 1993, the United States and the European Union have updated pesticide risk assessments, ending the use of acutely toxic

## Recent Development in Algal Biotechnology in the Production of Algal Based Food Supplement

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### ABSTRACT

*Algae are commonly present everywhere in water habitats. Due to their rich chemical composition and content of biologically active substances, they have been used in many industrial fields. In addition, algae are also used in the food industry as a food supplement and as a supplement for functional foods. Seaweed is also added to meat products, such as pasta, steak, hot dogs and sausages, as well as fish, fish products and oils, to improve their quality. Grain-based products, such as pasta, flour, and bread, are another group of seaweed-enriched products. Due to their properties, algae can also be used to formulate fermented functional foods. Fermented products containing seaweed are mainly dairy products, such as cheese, ice cream, dairy desserts, yoghurt, cottage cheese, and processed cheese. Combining a fermented product with a high content of lactic acid bacteria and algae with naturally occurring metabolic bio-actives creates a product with a high nutrient content and a food segment. Recently, there has been a great deal of interest in algae-based dietary supplements and bio-foods. Algae can also be exploited for the commercial production of various products such as dyes, animal feed, bioplastic, etc. The total food production of seaweed is estimated to be eight times that of terrestrial plants. Seaweed is rich in sources of protein, lipids, vitamins A, B, C and E; omega-3 fatty acids, etc. Many types of seaweed are edible, for example: - Ulva, Porphyra, Laminaria, Chlorella, Spirogyra, Gracilaria, Gelidium, etc. Many seaweed products are used in the food industry. eg Agar, carrageenan, etc.*

*Keywords: Algae, food supplements, product, Biotechnology, nutrients.*

### INTRODUCTION

Micro-algae and macro-algae are grown commercially to produce compounds, including carbohydrates, proteins, pigments, lipids, carotenoids, polyunsaturated fatty acids,

steroids, vitamins and others. The microalgae industry has increased its significance in various biotechnological processes over the past three decades.

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## The Growth of Algae Due to Physico-Chemical Parameters Concerning Climate Change in Shakambari Conservation Reserve, Rajasthan

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### ABSTRACT

*Finding biological factors affecting algal development is crucial in managing an ecosystem. Algae are small aquatic plants found as individual cells or in areas of varying sizes. They are an essential link in the aquatic food chain, serving as food for microscopic animals called zooplankton. As a byproduct of photosynthesis, algae also release oxygen into the water for use by fish and other aquatic animals. This paper proposes an approach to estimate algae's biological parameters, which are important factors in controlling eutrophication, using modelling and exploration techniques. Algae growth and respiration rates were estimated using a one-dimensional water quality model and two-dimensional spatially distributed water quality data obtained from Kot Dam of Shakambari Conservation Reserve Jhunjhunu District, Rajasthan. In total, 26 algae were found in the sample. The highest amount of algae corresponds to Green algae, Flagellate algae, Cyanobacteria, and Diatoms, of which 18 and 21 algae were identified in the summer and spring seasons, respectively. Natural freshwater algal growth is determined using a physico-chemical approach that provides an alternative method for estimating the biological parameters of algae beyond sampling and in situ testing.*

**Keywords:** Algal growth, biological parameters, water quality model, eutrophication, in situ testing.

### INTRODUCTION

Water is most important for Life on earth and for regulating the climate of our Environment. It is one of the most important compounds that profoundly affect Life. The quality of water is often described in terms of its physico-chemical and biological properties. The

process of rapid industrialization and the indiscriminate use of chemical fertilizers and pesticides in agriculture cause heavy and diverse aquatic pollution, leading to the deterioration of water quality and depletion of aquatic ecosystems.

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## Physico-Chemical Parameter of Kot Dam in Relation to Hydrophytes in Shakambari Conservation Reserve, Rajasthan (India)

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### ABSTRACT

*This research work deals with the study of the physico-chemical parameter of Kot Dam. Dam water samples were collected from Kot Dam, shakambari conservation reserve, Jhunjhunu district, Rajasthan (India) in winter season from November 2022 to December 2022. Samples were examined for physico-chemical parameters like pH, electrical conductivity (EC), dissolved oxygen (DO), Temperature, Salinity and total dissolved solids (TDS). pH ranged from 7.35 – 8.96, Electrical Conductivity ranged from 122.6 – 202.1  $\mu$ mhos/cm, Dissolved oxygen ranged from 0.3 – 0.7 mg/l, Temperature ranged from 13.9 °C – 16 °C, Salinity ranged from 4.1 – 6.6 ppt, TDS ranged from 155.6 – 244.2 ppm. The result of the proposed study will establish some facts about the use of water for various purposes like domestic and agriculture. Hydrophytes are an essential link in the aquatic food chain, serving as food for microscopic animals called zooplankton. As a byproduct of photosynthesis, Phytodiversity also release oxygen into the water for use by fish and other aquatic animals. In this paper, an approach is proposed to estimate the physico-chemical parameters of Dam water, which are important factors in controlling eutrophication using modeling and exploration techniques. In Dam water Hydrophyte plant diversity are determined using a physico-chemical approach that provides an alternative method for estimating the diversity. The study revealed that a total of 26 species of hydrophytes belonging to 9 genera and 11 families were identified. Among these, Cyperaceae was the dominant family comprising 6 species, out of which, monocots were represented by 9 species belonging to 3 genera and 3 families; dicots represented by 14 species belonging to 11 genera.*

**Keywords:** Hydrophytes, biological parameters, physico-chemical parameters, in situ testing.

### INTRODUCTION

Hydrophytes are water plants that's control the aquatic ecosystem. The variety and variability of hydrophytic plants have a major role in controlling aquatic ecosystems. Water is most

important for the Life on earth and for regulating the climate of our Environment. It is the most important compounds that profoundly affect Life.

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# Utility of *Trichoderma* Amended Compost to Manage Soil Borne Fungal Diseases of Vegetable Crops in Kota District of Rajasthan (India)

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## Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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## ABSTRACT

In the present research article, *Trichoderma* species was isolated and multiplied on a growth medium without contamination for compost preparation. The aim of this study was detecting organic substrates of *Trichoderma* spp. for their antagonistic ability, for this purpose six major agricultural fields of Kota district are selected, from each field about 3-3 samples of soil are collected to detect the percentage of fungal disease incidence and tricho-compost was applied over diseased plants to minimize the fungal attack over vegetable crops. It was observed that the disease incidence is minimized by using tricho-compost mixed with soil in Gopalpura and Balita Village.

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## A Comparative Study of Hindu Scriptural Concepts and Their Reflections in Whitman's Selected Lengthy and Smaller Poems

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Good Poetry and literature, whether of the East or of West, never lose their universal appeal, for they are the expression of human experience, embodying abstract ideas of man's nature and destiny in relation to the eternal order of things. As Whitman is also a pioneer of this referred arena, the religious thread of his poetry has to be examined from the viewpoint of Indology.

All the nine editions of *Leaves of Grass* display Whitman's adoption of Hindu objective and subjective religious ideologies, but he adopted them according to the different changing scenarios of the country and his personal life. Americans are fortunate to have such an excellent bard, as well as a fine ideologist as their influential poet.

Here the question arises whether there was an impact of Hindu religious concepts or absence of this reflection in Whitman's poetry? First, the paper is going to provide evidences regarding this point. Whitman has used the word *māyā* in its correct sense in his small poem "Are you the new person drawn towards me?"

Do you suppose yourself advancing on real ground toward a real heroic man?  
Have you no thought O dreamer that it may be all māyā, illusion?

(*Leaves of Grass* 123, 8-9).

In his epic length song "Song of Myself", he straightforwardly talks about 'shatras and Vedas'. (*Leaves of Grass*.78, 1104). Just Imagine, he was conversant with Hindu religion as early as in the mid nineteenth century! He wants to communicate with India and its Hindu scriptures in his famous poem "A Passage to India"

O soul, voyagest thou indeed on voyages like those?  
Disportest thou on waters such as those?

Soundest below the Sanscrit and the Vedas? Then have thy bent unleash'd. (*Leaves of Grass*.474, 239-242)

Secondly, as the research paper aims at the comparative study between the Hindu religious thread and Whitman's poetry, it is necessary to give evidences of Whitman's thought about religion's sublimity. To illustrate this profound affinity with faith, we can easily observe that he believes in the supremacy of religion:

Each is not for its own sake,  
I say the whole earth and all the stars in the sky are for religion's sake.

("Starting from Paumanok" 20, 102-106)

These lines from Whitman's poem "Starting from Paumanok" point out how much he was concerned about the religious aspect of the themes of his poems. His poetry has got varied themes. Religious concepts and spiritual weaving is one of the most prevalent motifs among them. About "Song of Myself", Malcolm Cowley says that the system of the doctrine suggested by the poem is more Eastern than Western as it includes notions of metempsychosis and karma. (*Leaves of Grass*. 923)

This paper includes some religious concepts specifically from Vedas and Upanishads. Monism is the most evident concept in his long poem "Song of Myself". Here, in the forty eighth section of this immortal song, I listen echoes of both *The Isā Upanishad* and *The Atharvaveda*:

I have said that the soul is not more than the body,  
And I have said that the body is not more than the soul,  
And nothing, not God, is greater to one than one's self is,

(*Leaves of Grass*. 86,1265-1267)

The body and soul are one according to Whitman, they are just as one as Jeev and Atma are one according to Upanishads. This non dualism prevails Whitman's poetry and Whitman was much influenced by such verses as has been proclaimed in *The Atharvaveda* thousands of years back. For presenting the comparison between the ideas depicted in the verses from "Song of Myself" and the impact of Vedic knowledge on Whitman's poetry, a step-by-step illustration method from both the



# Structural Studies and Synthesis of Macrocyclic Multidentated Ligands

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## Abstract

The Study presents new macrocyclic multidentated ligands have been synthesized, their structures have been characterized by I.R. & chemical analysis and correspond to P-methoxy benzhydra zone of benzimidazole - 2 - carboxaldehyde : 1:2- Di methyl ethane 1:2 di one ; pyrrol - 2 - acetyl glyoxal and benzaldehyde piconyl acid hydrazone and 2- hydroxy - 3 chloro benzaldehyde isonicotonyl acid hydrazone. This is new method has many advantages over reported method like easy work-up and excellent - yield with short reaction time.

## Keywords

Hydrazone, Isonicotinic acid hydrazides, Ligands, Macrocyclic, Picolinic acid, NSH, Aom, Reaction

## Introduction

There has been little systematic research on how the stereo-chemistry and spectral properties of metal complexes are affected by varying the nature and position of a certain donor atoms with in a given polydentate ligand. There is no systematic study available to transition metal complexes with tetra dentate ligands having nitrogen, oxygen and sulphur donors. The coordination chemistry of poly functional ligands with just nitrogen, oxygen and sulphur donors have received modest attention in recent years.

## Objective of the study

The Objective of the study of this research work is that to find out about Structural Studies and Synthesis of Macrocyclic Multidentated Ligands.

## Hypothesis of the study

The hypothesis of the study of this paper entitled Structural Studies and Synthesis of Macrocyclic Multidentated Ligands are as under-

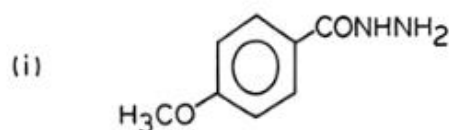
- 1- Certain other hydrazides of varying coordination sites for the metal ions have been studied by earlier workers
- 2- The ligand isonicotinic acid hydrazide which is an important antitubercular drug possess potential sites for the metal ions, has been used in complex formation with a view that the complexes isolated may be of the biological importance.

The present efforts are made in the direction of seeking a correlation between magnetic and spectral properties of the metal chelates derived from p-methoxy benzhydrazone of Benzimidazole-2-carboxaldehyde; 1:2-Dimethyl ethane 1:2-dione; Pyrrole-2-acetyl glyoxal and benzaldehyde piconyl acid hydrazone and 2-hydroxy-3-chloro benzaldehyde Isonicotonyl

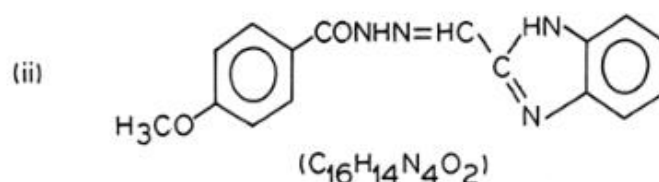
[[31]]

acid hydrazone. Hydrazides exist in two keto and enol forms, besides can deprotonate to form various species, interestingly some times a enolic oxygen atom acts as a bridge.

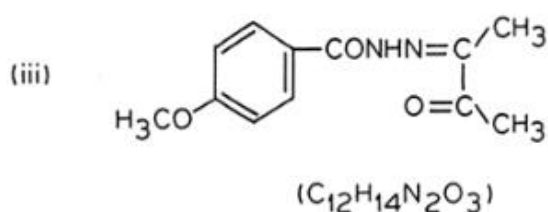
The NSH approach (Normalised spherical Harmonic Hamiltonian) using the parameters DQ, DS, DT etc. have several Four reaching advantages with respect to low symmetry complexes when compared with more classical crystal field approach (DQ, DS, DT parameters etc.). In particular the numerical magnitudes of the NSH parameters are independent of the coordinate frame of axis chosen which is not true for the crystal field parameters. The orbital angular overlap model (A.O.M.) on the other hand appears to provide an immediate assessment of the chemical bonding in the complexes via use of parameters apparently more readily identified with  $\sigma$  and  $\pi$  chemical bonding or antibonding. So the combined use of the crystal field parameters, 'NSH' and 'AOM' parameters provide a powerful mean for obtaining valuable stereo chemical information from electronic spectra.



p-methoxy-Benzoyl hydrazide.



[p-methoxy Benzoyl hydrazone-of  
Benzimidazole-2-Carboxaldehyde]



[p-methoxy Benzoyl hydrazone of  
1-2-Di methyl ethane.-1:2-Dione.]

(Fig.-A)

[[32]]

# A Study of Characterization and Tabulation of Macrocyclic Multidented Ligands By I.R. SPECTRA

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## Introduction

The present research summarized synthesis of six new macrocyclic multidented ligands successfully in alcoholic medium. The ligands synthesized quantitatively and qualitatively and their structures have been characterized by chemical analysis and I.R. Spectra.

## Keywords

Hydrazoned, Drug designing, Anti Microbiological activity, Semi carbazones, Tabulation, Characterization

## Objective of the study

The Objective of the study of this Paper is that to find out the work of Macrocyclic Multidented Ligands By I.R. Spectra.

## Hypothesis of the study

The hypothesis of the study of this paper entitled A Study of Characterization and Tabulation of Macrocyclic Multidented Ligands By I.R. SPECTRA are as under-

- 1- These reagents act as good chelating agents and form complexes with various metalions by bonding through sulphur, nitrogen and oxygen atom. The semicarbazones, and hydrazones are important organic analytical reagents. They contain azomethine nitrogen atom.
- 2- It has been indicated that the microbiological activity of these compounds is due to their ability to chelate trace of metal ions. They show remarkable pharmacological activity and have wide biological applications. The group  $-C-NH-NH_2$  is of considerable chemotherapeutic interest and is responsible for the pharmacological activity.
- 3- Their ready synthesis and myriad properties have contributed greatly to their popularity and to the study of many biological systems. Amongst the azomethine derivatives of hydrazine and substituted hydrazines those having  $>C=N-NH_2$  moiety have been comparatively less investigated in terms of their chelating ability.

## Analysis

This study deals with preparation of ligands namely p-methoxy benzohydrazone of Benzimidazole-2-carboxaldehyde; 1:2-Di-Methyl ethane-1:2-Dione and Pyrrole-2-aceteyl glyoxal and 2-Hydroxy-3-Chloro benzaldehyde Isonicotinoyl hydrazone. The prepared

[[34]]

compounds were characterized by chemical analysis and infra red spectral data. Purity have been checked by Thin Layer Chromatography using Silica gel adsorbent.

Table (1)

Tentative assignments of the frequencies ( $\text{cm}^{-1}$ ) of IR Spectra of ligands (in  $\text{cm}^{-1}$ )

S. No.	Ligands	$\nu(\text{OH})$	Aromatic ring	$\nu(\text{C}\equiv\text{N})$	$\frac{\nu(\text{C}=\text{S})}{\nu(\text{C}=\text{O})}$	$\delta \text{NH}_2$ Stretch of plane stretch	$\nu(\text{NH})$ out	$\nu(\text{NH})$ stretch
1.	Isonicotonyl acid hydrazide ( $\text{C}_6\text{H}_7\text{N}_3\text{O}$ )	3420(w)	1400 (m)	1660(s)	1690(s)	910 (s)	740 (m)	3240 (s)
2.	2-OH-3-Chloro Benzaldehyde Picolinoyl acid hydrazone ( $\text{C}_{13}\text{H}_{10}\text{O}_2\text{N}_3\text{Cl}$ )	3410(w) $\nu(\text{OH})$ of phenol Phenolic $\nu(\text{C}=\text{O})$ $\delta(\text{OH})$ of Phenol Phenolic CO. bending C=O of glyoxal	1440 (m)	1650(s) 3330(m) 1520(s) 1320(vs) 1270(u) 1650	1700(s)	915 (s)	750 (s)	3220 (s)
3.	2-OH-3-Chloro Benzaldehyde Isonicotonyl acid hydrazone ( $\text{C}_{13}\text{H}_{10}\text{O}_2\text{N}_3\text{Cl}$ )	3440(m) $\nu(\text{OH})$ of phenol Phenolic $\nu(\text{C}=\text{O})$ $\delta(\text{OH})$ of Phenol Phenolic CO. bending C=O of glyoxal	1450 (m)	1665(s) 3240(s) 1540(s) 1320(vs) 1260(u) 1690	1700(s)	920 (s)	790 (m)	3350 (s)

Table (2):

S. No.	Name of Compound	Colour	M.P.	Calculated / found		
				C	H	N
1.	p-methoxy benzoyl hydrozide ( $\text{C}_7\text{H}_{10}\text{N}_2\text{O}_2$ )	Colourless	145 <sup>o</sup>	49.36 (49.48)	5.12 (5.15)	14.32 (14.43)
2.	p-methoxy benzoyl hydrazone of Benzimidazole 2-Carboxaldehyde ( $\text{C}_{16}\text{H}_{14}\text{N}_4\text{O}_2$ )	Reddish	122 <sup>o</sup>	65.04 (65.30)	4.68 (4.76)	18.98 (19.04)
3.	p-methoxy Benzoyl hydrazone of 1:2-Dione. ( $\text{C}_{12}\text{H}_{14}\text{N}_2\text{O}_3$ )	Light yellow	118 <sup>o</sup>	61.36 (61.53)	5.92 (5.98)	11.90 (11.96)
4.	p-methoxy Benzoyl hydrazone of Pyrrole-2 acetyl glyoxal ( $\text{C}_{14}\text{H}_{13}\text{N}_3\text{O}_3$ )	Light Brown	110 <sup>o</sup>	61.84 (61.99)	4.72 (4.79)	15.39 (15.49)

[[35]]