



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

	Content	Page No
2019-20	Number of research papers published per teacher in the Journals notified on UGC care	1-14

Article-47

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Effect of vegetable oil mill effluents on seed germination and seedling growth of *Glycine max* (L.)

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(Received 1 September, 2019; accepted 8 November, 2019)

ABSTRACT

Present study was carried out to assay the effects of vegetable oil mill effluents on soybean. For that purpose Soybean oil mill effluent and Mustard oil mill effluent were taken. Different concentrations (0% control, 20%, 40%, 60%, 80% and 100% OME) were used for both the effluents. Seeds of *Glycine max* (L.) variety Pratap Soya 1 were used to test the effect of different concentration of effluents on seed germination and seedling growth. Physicochemical characteristics of these effluents revealed that both of them contained high amounts of sulphates, nitrates, calcium, various heavy metals etc., while DO was very low, which confirms their highly polluted conditions. Maximum seed germination percentage was found in control (0% OME) as well as in experimental set with 20% OME in both the treatments. Seed germination shows decreasing trend with further increase in OME concentration. Results show that lower concentrations enhanced the growth in early stages of development in Mustard OME but during later stages growth shows decreasing trend in both the treatments.

Key words: Oil mill effluent, Seed germination, Seedling growth.

Introduction

In recent years industrial effluent related pollution has come out as serious concern worldwide. In most of the cases effluents are discharged with or without treatment into nearby agricultural fields or water bodies. This causes serious contamination of soil and water which is associated with many diseases (WHO, 2002).

In India, 13,500 Million Litres per Day (MLD) industrial wastewater is generated and the treatment capacity available for industrial wastewater is only for 8,000 MLD(CPCBreport, 2005). Data presents only 60% of the total waste water generated by industries is treated before discharging (Kaur *et al.*, 2012) and rest discharged untreated into nearby soil or water bodies. Discharge of untreated effluent into water body results in decrease of water pH, and an

increase of temperature, Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), turbidity, heavy metals and toxic chemicals (Santiniketan and Vishva-Bharti, 1994). Hence these industrial effluents are the most potential source of water and soil pollution.

In the recent past alternative use of industrial effluent in irrigation has emerged as an important way of reusing waste water. Due to scarcity or limited availability of water and being rich in essential nutrients these effluents are being used for irrigation especially for raising vegetables and fodder (Ghafoor *et al.*, 1994). This can be advantageous because of the presence of considerable quantities of N, P, K and Ca along with other essential nutrients (Niroula, 2003). Continuous use of industrial effluents in agriculture has some negative effects also. Industrial effluents contain heavy metals as well as

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WOODS USED FOR MUSICAL INSTRUMENTS FOUND IN THE REGION OF SIKAR DISTRICT

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ABSTRACT

During ethnobotanical study of Sikar district (Rajasthan), observations were made on the timbers used by the tribals for making musical instruments. The district of Sikar is located on 74.44° – 75.25° E and 27.21° – 28.12° N, longitudes and latitudes respectively. Most of the area comes under arid and semi-arid climate. Music and dancing are important part of Meena and Garasia tribals inhabiting region of Sikar district. These tribals make different musical instruments such as Bansuri (Flute), Dholak (Tabor or Tom-tom), Dhol (Drum), Ghunghroo (Ankle bell), Papiya (Whistle), Poongi (Been) and Sarangi (Violin) using 18 tree species.

Key Words: Tribals, Sikar district, timber, musical instruments.

INTRODUCTION

Musical instruments are constructed and used world wide for joy, happiness, festivals, celebrations, expression of sentiments etc. From ancient times audio and beat have been an intricate part of human day to day life, and it does not depend on the region, religion, caste and culture. In 1871 Darwin wrote "It appears probable that the progenitors of man, either the males or the females or both sexes, before acquiring the power of expressing their mutual love in articulate language, endeavoured to charm each other with musical notes and rhythm....."

Recently vast research has been done on material sciences, despite this; wood is all time preferred material for the construction of musical instruments. If we compare materials such as plastic and metal with wood, it has very distinguishing features such as light weight, intermediate quality factor (Yoshikawa and Waltham 2014) and more over acoustic properties such as the speed of sound, the characteristic impedance, the sound radiation coefficient and the loss coefficient (Wegst 2006).

About 35,000 years ago, when the oldest surviving cave paintings and sculptures were made in the Geibenlosterle cave in south western part of Germany, flutes were played (Conard 2004). The oldest surviving musical instruments discovered by the scientists are made of bone and ivory, because organic materials decay more quickly than their mineralized forms (Wegst 2006).

Von Hornbostel and Sachs (1914) grouped all the present and past musical instruments into five categories viz;

1. Idiophones – instruments that make sound by oscillating themselves, without the use of membranes or chains (Ex. Xylophones).

2. Membranophones – tools that uses a extended membrane to produce the sound (Ex. drums).
3. Chordophones – instruments that rely on a stretched string (Ex. Violins, guitars and pianos).
4. Aerophones – instruments that rely on a oscillating wind pillars for sound creation (Ex. Flutes, clarinets and didgeridoos).
5. Electrophones – tools that create sound by electronic means (Ex. Keyboard synthesizers).

Other than wood, a large number of natural materials have been used for the construction of musical instruments such as bone, skin, hide, bladder, horn, gourds, calabashes, sea shells and armadillo shells. For strings and in bows, green fibres, silk, gut, and animal hairs are used (Wegst 2008).

MATERIALS & METHODS

In the present study a survey was conducted among the tribals of Sikar district which included the use of different musical instruments by the people, the wood (tree species) which was used for the construction of these instruments and its availability in the region.

MUSICAL INSTRUMENTS

The musical instruments which are manufactured and used by the people and became characteristically unanimous with the tribals of Sikar district are listed below:

1. **Bansuri (Flute):** Also called as flute is a aerophone. In this instrument as the air passes through the wooden column it produces vibrations; these vibrations are heard in the form of music. The audible range is high and can be heard clearly at far distance. The flute is prepared with 1-2 feet long hollow bamboo (*Bambusa sps.*) stick.

4. Comparative Study of Covid - 19 Pandemic on Ecotourism of Jhalawar District (Rajasthan), India

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Abstract

Over the last 4 years Rajasthan experienced a remarkable growth in number of tourists. Number of local tourists increased almost 30% whereas overseas tourists increased more than 15% between only 4 years. Compare to the state and other districts, Jhalawar faces fluctuations in overall tourism market, current research indicates 4 years (2015-2018). After the declaration and extension of lock down, The most affected is the tourism and travel industry. With the cancellation of international flights, restrictions on domestic flights and other restrictions have caused considerable outbreak to the tourism industry. Rajasthan government announced complete lock down on 21 March 2020 and two time extensions in it till 17 May. In terms of tourism industry March, April and May are three major remunerative month for Rajasthan. Current study depicts possible impact of covid-19 on four years (2015-2018) reference to travel and tourism of Jhalawar district of Rajasthan. Data analysis of past 4 years were done, secondary data provided by Tourism department of district Jhalawar, RTDC (Rajasthan Tourism Development Corporation) and available on RTDC website with Archaeological department, Jhalawar (For Gagron fort).

Key words: Covid-19, Pandemic, Lockdown, Tourism industry

Introduction

According to WHO "A pandemic is the worldwide spread of a new disease," Pandemic affects the economy not only of the country but of the world. Most of the country's budget is spent in the form of healthcare Just like covid-19 pandemic has destroyed China's economy, it is very difficult for most countries of the world to estimate it. Presently, this pandemic is spreading rapidly in India too. India has become the 6th most affected country in the world from it.

According to The International Ecotourism Society (TIES), ecotourism can be defined as "responsible travel to natural areas that conserve the environment, sustains the well-

Shuchita Jain

OXIDATIVE DEGRADATION OF ORANGE G BY PERXOMONOSULFATE IN PRESENCE OF BIOSYNTHESIZED IRON NANOPARTICLES

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Abstract: The present study reports stable dispersed nano-sized iron nanoparticles (FeNPs) were prepared by the biosynthesis process without any protecting gas. The biomolecules present in leaf extract act as reducing and stabilizing agent in an aqueous medium. The formation of FeNPs was characterized by UV visible spectrophotometric and Fourier transform infrared spectrophotometric techniques. The study reports the maximum absorption peak of UV Visible spectra observed at 250 nm wavelength and FTIR peak at 3000cm⁻¹ confirms the formation of zero-valent iron nanoparticles. The synthesized nanoparticles were applied as a catalyst in the degradation of orange G in presence of peroxomonosulphate (PMS). The degradation rate was found to follow first-order kinetics with respect to PMS. The effect of different experimental conditions, as well as the addition of neutral salts on the oxidative degradation of orange G, were also studied. The biosynthesized Fe-NPS is expected to be a suitable substitute and play a significant role in the field of catalysts and environmental revolution.

Keywords: Iron Nanoparticle, Azadirachta Indica (Neem), Orange G, Catalyst, oxidative Degradation, Peroxomonosulphate.

INTRODUCTION: Contamination of water by anthropogenic pollutants poses major environmental hazardous and motivates the development of efficient, cost-effective water treatment technologies^{1,2}. While established water treatment technologies seem quite mature, so that performance improvement appears less likely, nanotechnology may offer great opportunities to undoubtedly upgrade process performance and significance^{3,4}. Specifically the unique properties of nanoparticles may increase catalytic activity and lead to significant enhancement of process performance by reducing reaction time and overall chemical demand^{5,6}. The advanced oxidation process (AOP) is the name given to several oxidation methods that are based on the generation of strong free radicals for destroying organic pollutants present in anthropogenic sources. In the past years, persulfate such as peroxomonosulphate (PMS, HSO₅⁻) and peroxodisulfate (PDS, S₂O₈²⁻) have attracted increasing attention because they show more stability than hydrogen peroxide. Furthermore, persulfate and their product (SO₄⁻²) have the least effect on natural organisms⁷. Additionally, the sulfate radical (E⁰ = 2.5-3.1v) generated in activated persulfate systems is more selective than the hydroxyl radical (E⁰ = 1.8-2.7 v) for the degradation of organic compounds with carbon-carbon double bond and aromatic rings⁸. Thermal radiation⁹, U.V. light¹⁰ and transition metal¹¹ are the main technologies for persulfate activation. Moreover, the higher energy needs for thermal, U.V. light radiation and the risk of secondary pollutants compel further application of these methods. Therefore, it is a great interest to develop low cost, highly effective methods for the activation of persulfates for dye removal processes.

Transition nano-metal activated peroxomonosulphate (PMS) technology has been successfully applied to degrade organic pollutants¹². Among various transition metal ion, iron-mediated decomposition of PMS is an efficient catalytic system to generate SO₄⁻ as the major oxidizing species¹³. The nano mediated FeNPs/PMS system for the degradation of organic pollutants has shown a lot of interest due to its significant effectiveness under different experimental conditions. To promote the performance of the catalyst, nano-sized catalysts draw attention in recent years because of their unique properties and a broad range of applications such as photocatalysis¹⁴, sonocatalysis¹⁵ etc. Nanoscale zero-valent iron particles represent a new generation of environmental remediation technologies that could cost-effective solutions for most challenging environmental problems. Research has reported that iron nanoparticles (FeNPs) are very effective for the transformation and detoxification of a wide variety of environments pollutants¹⁶.

The biosynthesis of nanoparticles received importance than physical and chemical methods^{17, 18} because they are costly and hazardous. Therefore, in the search cost, and effective method for biosynthesis of



Kinetics and mechanism of electron transfer reactions: Oxidative degradation of fluoroquinolone drugs in aqueous acidic/alkaline medium[†]

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Pharmaceuticals, especially antibiotics, have received increasing global concern, due to their intensive use in the environment and potential harm to ecological system as well as human health. Among various antibiotics, fluoroquinolones are of extreme interest, since they are broad-spectrum antibacterials with a growing demand in hospitals, households, and veterinary applications. Wastewater discharge from conventional wastewater treatment plants is the main source of fluoroquinolone in the aquatic environment. Removal of fluoroquinolone residue from aquatic environment is, therefore, considered as a priority and serves as an important study. For the degradation of FQs in aqueous solution, interesting remedial processes are required such as oxidation-degradation process in which formed intermediates mineralized into CO₂, water, and mineral species. The electron transfer reactions and their mechanisms are of much importance in understanding various types of biochemical, pharmaceutical and industrial reactions. Kinetics has played a significant role in understanding the intricacies of such reactions. Nanosized colloidal manganese dioxide, hexacyanoferrate(III), diperiodatocuprate(III), potassium permanganate etc. used as effective oxidants for oxidative degradation of different fluoroquinolone antibacterial agents in aqueous acidic/alkaline system. In this regard, we investigated a kinetic study of oxidation of moxifloxacin (MF) by diperiodatocuprate(III) (DPC) in aqueous alkaline medium. The reaction was first order with respect to [DPC] and less than unity order with [MF]. The pseudo-first order rate constant (k_{obs}) changes differently under different concentration of alkali. The results indicate that at higher hydroxyl ion concentration DPC complex exists in CuL, whereas at lower hydroxyl ion concentration in form of Cu(HL)₂. The thermodynamic parameters associated with the oxidation reaction have been evaluated and discussed.

Keywords: Fluoroquinolone, aqueous alkaline medium, thermodynamic parameters, kinetics, oxidation.

Introduction

Fluoroquinolones are a family of synthetic antibacterial agents with a rising popularity. These antibiotics display a broad spectrum of antibacterial activity including strong effects on Gram-negative aerobic and anaerobic organisms as well as on Gram-positive and atypical pathogens^{1,2}. Moxifloxacin (MF), 1-cyclopropyl-6-fluoro-1,4-dihydro-8-methoxy-7-[[4*as,7as*]-octahydro-6*H*-pyrrolo[3,4-*b*]pyridine-6-yl]-4-oxo-3-quinolone carboxylic acid monohydrochloride, is an antibacterial synthetic drug that belongs to the fourth generation of fluoroquinolones³⁻⁵. As a new generation of antibacterial fluoroquinolone, MF has strong antibacterial activity, good clinical effects with little toxicity. The use of this newer generation fluoroquinolone is increasing due to expand antibacterial spectrum which makes them useful in a broader

range of applications⁶. But these are not fully metabolized in the body and are partially excreted in its pharmaceutically active form^{7,8}. As a result of their excessive usage, antibacterial may enter into the environment through waste water and manure from animal husbandry etc.^{9,10}. The presence of antibacterial drugs in the aquatic environment that will become the source of potable supply, merits particular concern because of health risks. Effective removal of antibacterial drugs by water treatment process is important to minimize the potential health risks. For the removal of these fluoroquinolone many studies are used, in which oxidation process is mostly used and degrade them from the environment^{11,12}. Recently, transition metals in their higher oxidation states can be stabilized by chelation with metal chelate such as diperiodatocuprate(III), diperiodatocuprate(III) and



Research Article

Soluble Colloidal Manganese Dioxide: Formation, Characterization and Application in Oxidative Kinetic Study of Ciprofloxacin

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Abstract

Soluble colloidal manganese dioxide was formed by reduction of potassium permanganate with sodium thiosulphate in neutral aqueous medium at 25 °C. The obtained nano-sized colloidal manganese dioxide was found to be dark reddish-brown in color and stable for several months. The formation of manganese dioxide was confirmed by UV-visible spectrophotometer and determination of oxidation state of Mn species in manganese dioxide. The effect of different concentration of sodium thiosulphate on the formation of manganese dioxide was also studied. The nano-sized colloid manganese dioxide was characterized by transmission electron microscopy and Fourier transform infrared spectrophotometer. The formed soluble colloidal manganese dioxide was used as an oxidant in oxidation of ciprofloxacin in perchloric acid medium at 35 °C. The reaction was first-order concerning to concentration of manganese dioxide and hydrogen ion but fractional order with ciprofloxacin. The results suggest formation of complex ciprofloxacin and manganese dioxide. The oxidation products were also identified based on stoichiometric and characterization results. Copyright © 2020 BCREC Group. All rights reserved

Keywords: Soluble colloidal manganese dioxide; Ciprofloxacin; Characterization; Kinetics; Oxidation

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1. Introduction

Manganese dioxide (MnO_2) is one of the most important oxidizing agent for both organic and inorganic compounds [1,2] with an oxidation potential of 1.23 V [3]. Due to its importance such as the low toxicity, low cost, electrochemical behavior, environmental compatibility and ease of handling, many researchers have been developed different methods for preparation of soluble colloidal MnO_2 [4-6]. Soluble colloidal MnO_2 is generally formed by the reduction of MnO_4^-

ion in aqueous solution with many reductants including Mn^{2+} ion [7]. Perez-Benito *et al.* [8-10] have also been reported as a method for preparation of perfectly transparent dark brown water-soluble colloidal manganese dioxide sols by the permanganate-thiosulphate reaction in aqueous neutral conditions. The formed soluble colloidal MnO_2 has been characterized by different instrumental techniques and determined by iodometric method [11-13]. The existence of manganese(IV) in the aqueous solution in colloidal form and as negatively charged species has been reported in the literature. [14-16] and the oxidizing ability is limited under ordinary conditions due to its insolubility [17]. In fact, manganese oxides have been shown to be capable of ox-

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From the journal:
New Journal of Chemistry

Deep eutectic solvent promoted synthesis of structurally diverse hybrid molecules with privileged heterocyclic substructures†

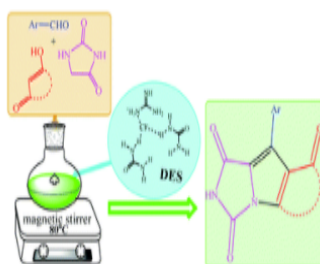


Esha Rushell,^a Yogesh Kumar Tailor,^a Sarita Khandewal,^a Kanchan Verma,^a Monu Agarwal^a and Mahendra Kumar^{†a}

Author affiliations

Abstract

An efficient and eco-friendly diversity oriented synthetic protocol has been presented to synthesize structurally diverse drug-like small hybrid molecules; indenopyrroloimidazoles, imidazoindoles, chromenopyrroloimidazoles and imidazopyrrolopyrimidines, using deep eutectic solvent (DES), guanidinium chloride and urea, as a sustainable solvent and promoter. The use of DES (guanidinium chloride and urea) as a recyclable and reusable solvent and promoter has been explored for the first time in the synthetic domino protocol involving one-pot, three component reaction of hydantoin, 1,3-diketones and aldehydes with special features of the protocol; high atom-economy, operational simplicity, mild reaction conditions, short reaction time, and high selectivity with excellent yields.


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Mol Divers. 2020 Nov;24(4):1355-1365. doi: 10.1007/s11030-019-09999-4. Epub 2019 Oct 9.

Efficient and environmentally sustainable domino protocol for the synthesis of diversified spiroheterocycles with privileged heterocyclic substructures using bio-organic catalyst in aqueous medium

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Affiliations

PMID: 31598819 DOI: 10.1007/s11030-019-09999-4

Abstract

An efficient and environmentally sustainable synthetic protocol has been presented to synthesize structurally diverse spiroindoles spiroannulated with indenopyrroloimidazoles, pyranopyrroloimidazoles, chromenopyrroloimidazoles, and imidazopyrrolopyrimidines involving three-component reaction of isatins, hydantoin, and β -diketones in the presence of green and sustainable bio-organic catalyst, β -amino acid, 2-aminoethanesulfonic acid (taurine), in aqueous media. The synthetic efficiency, operational simplicity, and reusability of catalyst make the present synthetic protocol cost effective, time efficient, and eco-friendly to synthesize molecules with structural diversity and molecular complexity and expected to contribute significantly not only to drug discovery research but also to pharmaceutical and medicinal chemistry.

Keywords: Bio-organic catalyst; Environmentally sustainable; Multicomponent reactions; Pyrroloimidazoles; Spiroheterocycles.

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Applied Organometallic Chemistry / Volume 34, Issue 10 / e5836

FULL PAPER

Synthesis and characterization of terbium doped TiO₂ nanoparticles and their use as recyclable and reusable heterogeneous catalyst for efficient and environmentally sustainable synthesis of spiroannulated indolo[3,2-c]quinolines- mimetic scaffolds of isocryptolepine

Kanchan Verma, Yogesh Kumar Tailor, Sarita Khandelwal, Monu Agarwal, Esha Rushell, Sakshi Pathak, Yogita Kumari, Kamendra Awasthi, Mahendra Kumar ✉

First published: 08 June 2020

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Citations: 1

Abstract

An efficient and environmentally sustainable domino protocol has been presented for the synthesis of structurally diverse spiroannulated indolo[3,2-c]quinolines involving three component sequential reaction of phenylhydrazine, *o*-aminoacetophenone and cyclic ketones using nanostructured terbium doped TiO₂ as recyclable and reusable heterogeneous catalyst. The nanostructured catalyst was synthesized successfully and characterized by X-ray Diffraction (XRD), transmission electron microscopy (TEM), EDX and Fourier transform infra-red spectroscopy (FTIR). The substitution of Ti⁺⁴ with Tb⁺³ and the formation of Ti-O-Tb bonds as a result of doping of Terbium with TiO₂ NPs increases the catalytic efficiency and facilitates the reaction to provide the products in excellent yields. The present protocol with special features; operational simplicity, atom-economy, mild reaction conditions, environmental sustainability and high synthetic efficiency with recyclability and reusability of catalyst has been reported for the first time to synthesize spiroannulated indoloquinolines and expecting to provide the library of promising new leads in drug discovery research.

Citing Literature

IMPACT OF GROUNDNUT SEED EXTRACTS IN BIOCONTROL MEASURES OF CALLOSBRUCHUS MACULATUS (FAB.) PULSE BEETLE IN STORED COWPEA

¹Mosmee Meena And ²Jaishree Daveeray
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1. INTRODUCTION

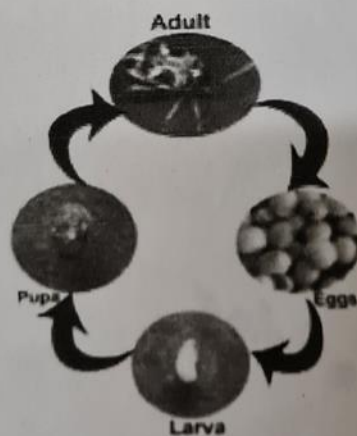
Callosobruchus maculatus: A highly obnoxious pest and only larval stage damages the cowpea seed to combat these notorious insects man has relied on the use of various measures such as mechanical, physical, biological and chemical control methods. The use of botanical pesticides, which has declined due to the emergence of synthetic organo-chlorine and organo-phosphate insecticides. The botanicals have additional advantage over synthetic insecticides since these are safe to non-target animals.

Groundnut seed extracts used as bio pesticides to control *Callosobruchus maculatus*. The ingredients of botanicals have exhibited there bio-activity against insect pests as repellent, antifeedent, growth regulator and strident effects. In addition, direct toxicity and impairing of hatch ability was observed. he use of these chemicals in pest management in enhanced crop productivity and helped in eradication of diseases. Despite the occasional warning synthetic pesticides quickly become the favored means of crop production and drastically eclipsed other approaches to pest management.

Now the environment is getting flooded with a broad array of synthetic pesticides. The benefits brought by this insecticidal revolution to mankind stand remarkable testimonial to women intelligence and technological proves but this blessing was not an unmixed one and has been at a tremendous environmental cost. In the recent past, the use of indigenous plant materials has acquired an important position in the modern approach of pest control as they are comparatively safer to mammals due to their biodegradable nature.



Male



CHANGES IN BIOCHEMICAL PARAMETERS OF SWISS ALBINO MICE AFTER CADMIUM CHLORIDE EXPOSURE

Dr. Jaihree Daverey, Deptt. Of Zoology, J.D.B. Govt. Girls College, Kota

Abstract:- Excessive levels of trace elements may occur naturally as a result of geological phenomenon such as ore formation, weathering of rocks and leaching. Human activities, for instance, burning of fossil fuel, mining, smelting, discharging industrial, agricultural and domestic waste are far more responsible for the presence of heavy metals in the atmosphere than the natural geological phenomenon. Some metals such as lead, mercury, chromium, cadmium, arsenic are highly toxic in minor quantities. Cadmium as an industrial pollutant has aroused a great concern due to its toxic effects on the various body tissues. Therefore, an attempt has been made to study the changes in the biochemical parameters-Serum Glutamic Oxaloacetic Transaminase (SGOT) and Serum Glutamic Pyruvic Transaminase (SGPT) of Swiss albino mice after cadmium chloride exposure. For the experiment, adult healthy male Swiss albino mice (6-8 weeks old) were used for the experiment. The aqueous solution of the cadmium chloride was prepared by dissolving 20 mg of cadmium chloride in 1000 ml of the glass distilled water, thus giving the concentration of 20 ppm and then administered orally in drinking water. Animals were autopsied by cervical dislocation at each post-treatment interval of 1, 2, 4, 7, 10, 14 and 28 days. Three normal mice were also autopsied. Immediately after autopsy, the blood was collected by cardiac puncture in heparinized tubes for studying biochemical parameters SGOT and SGPT. The present investigation revealed an increase in SGOT and SGPT activities continuously upto day-10 after cadmium exposure and decreasing thereafter. Decrease in protein levels in the tissue can be attributed to the increase GOT and GPT activities.

Keywords:- Cadmium chloride, SGOT, SGPT.

1. INTRODUCTION

Environmental pollution is an undesirable change in physical, chemical and biological characteristics of water, air and soil that is harmful for all living organisms including plants. Most of the pollution problems which we face today stem from the overexploitation of our natural resources, technological advancement, urbanization and industrial revolution. Excessive levels of trace elements may occur naturally as a result of geological phenomenon such as ore formation, weathering of rocks and leaching.

Human activities, for instance, burning of fossil fuel, mining, smelting, discharging industrial, agricultural and domestic waste are far more responsible for the presence of heavy metals in the atmosphere than the natural geological phenomenon. Cigarette smoking can cause significant increase in the concentrations of cadmium in kidney, the main target organ for cadmium toxicity. [1] Once perpetuated in the environment, metals are not readily detoxified by metabolic activity. As a result they get accumulated contributing to potential environmental hazard.

Some metals such as lead, mercury, chromium, cadmium, arsenic are highly toxic in minor quantities. Cadmium as an industrial pollutant has aroused a great concern due to its toxic effects on the various body tissues. Therefore, an attempt has been made to study the changes in the biochemical parameters- Serum Glutamic Oxaloacetic Transaminase (SGOT) and Serum Glutamic Pyruvic Transaminase (SGPT) of Swiss albino mice after cadmium chloride exposure.

2. MATERIALS AND METHODS

Adult healthy male Swiss albino mice (6-8 weeks old) were used for the experiment. Animals were fed with standard mice feed and water ad libitum.

2.1 Cadmium Chloride treatment

The aqueous solution of the cadmium chloride was prepared by dissolving 20 mg of cadmium chloride in 1000 ml of the glass distilled water, thus giving the concentration of 20 ppm and then administered orally in drinking water.

The animals for the experiment were divided into following groups:-

- **Group I:** Animals of this group served as control (Normal).

STUDY OF DEVELOPMENTAL BEHAVIOUR OF *C. MACULATUS* (FAB.) ON SOME SOYBEAN VARIETIES

Manisha Sharma

Department of Zoology, JDB. Govt. Girls College, Kota.

Abstract:- Soybean is one of the most important legume cum oil seed crop across the globe. With an increase in its production in India, especially in the last two decades, there has been an increase in insect pest species infesting soybean at different stages of growth and storage. In the present work, the varietal preference and development of storage pest, *Callosobruchus maculatus* (F) was studied on twelve different varieties of soybean to assess their resistance towards the pest. The results of the developmental behaviour of the pest revealed that of the twelve varieties screened, MAUS 71, JS 90-41, DS 97-12 and JS (SH) 93-37 were most preferred varieties while RSC 3, PK 472 and VLS 2 existed in the less preferred group. The moderately preferred group included JS 335, MAUS 61-2, Himso 1563, JS 93-07 and Punjab 1 varieties. No significant correlation was observed on the effect of oil and protein content of soybean varieties on development of *C. maculatus*.

1. INTRODUCTION

Soybean (*Glycine max.*(L.) Merrill) popularly known as the golden bean is an important legume cum oil seed crop across the world. It not only contains about 40% protein and 20% oil but also has essential amino acids, unsaturated fatty acids, carbohydrates, vitamins and minerals (Anonymous, 2006). Thus it has the potential to provide nutritional security to every section of the society of our country. Considerable research has been ongoing for yield improvement in order to meet the increasing demand of soybean for edible oil, animal feed and direct consumption as food.

Yet, in the changing climatic scenario, soybean once considered to be relatively resistant to bruchid attack has now been reported to be susceptible to soybean bruchid (*Bruchidius mackenziei* kingsolver) and cowpea bruchid (*Callosobruchus maculatus*) by Rees (2010) and Saruchi and Thakur (2014) respectively. Also holding back the crop to get lucrative prices with poor storage infrastructure gives way to storage pests thus causing damage to the grain (Rajguru et al., 2006 and Sharma and Singh, 2009). Hence the present study was undertaken to study the developmental behaviour of *C. maculatus* on different varieties of soybean and to identify the resistant ones amongst them so as to recommend them for future use by farmers.

2. MATERIAL AND METHODS

Healthy soybean seeds of twelve varieties viz., Punjab 1, MAUS 61-2, VLS 2, MAUS 71, JS 93-05, JS 90-41, Himso 1563, PK 472, DS 97- 12, RSC 3, JS 335, JS (SH) 93-37 were obtained from ARS, Ummadganj, Kota. The seeds were cleaned and sterilized to eliminate hidden infestation. "Multiple-choice method" was used to study the varietal preference for egg laying by *C. maculatus*. Twenty pairs of one day old adults of *C. maculatus* were released in a large circular dish having twelve compartments, each for one soybean variety. The dish was covered with muslin cloth to prevent the test insects from escaping out. Three replicates were maintained.

The released insects were removed after 72 hours with the expectation of maximum oviposition during this period. Observations on the number of eggs laid on each variety were recorded. The experiment was continued for the next 60 days to record the total number of days taken for completing its life cycle from oviposition to adult emergence. In order to assess the grain damage, approximately fifty grams of soybean seeds of each variety were taken in separate glass jars and one day old adult beetles were released in each jar. Adults were allowed to lay eggs till their death. Three replicates were maintained. The per cent grain damage for each variety was calculated as:

$$\text{Per cent grain damage} = \frac{\text{No. of damaged seeds}}{\text{Total no. of seeds}} \times 100$$





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Research Article

Histopathological Changes in the Spleen of Swiss albino Mice after the Combined Exposure of Radiation and Cadmium

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ABSTRACT

With the technological advancement and diversification of industries, combined with specialization in all fields, the volume and complexity of metals is also increasing day by day. Interaction of metals with other agents is an important aspect as both can interact in a "synergistic" or "additive synergistic" manner, further aggravating the situation. In the present study, combined effect of radiation and cadmium on spleen of mice has been investigated. For the experiment, adult, healthy male Swiss albino mice were exposed to different doses of radiation and also fed with the aqueous solution of CdCl₂ which was prepared by dissolving 20 mg of cadmium chloride in 1000 ml of glass distilled water, thus giving a concentration of 20 ppm and then administered orally *ad libitum* in drinking water continuously, till the end of the experiment. Animals were autopsied by cervical dislocation at each post-interval of 1, 2, 4, 7, 10, 14 and 28 days. Spleen was taken out, weighed, fixed in Bouin's fluid, dehydrated and embedded in paraffin wax. Transverse sections were cut at 5µ from middle part of the tissue and stained with Harri's haematoxylin-eosin stain for histopathological studies. Pathological changes after combined exposure in the present investigation depends upon the total dose of radiation provided i.e. higher the dose, higher the damage. Most striking histopathological change in the spleen was loss of lymphoid structure, inflammation, fibrous tissue proliferation, pyknosis, necrosis, karyolysis, karyorrhexis.

Keyword: Synergistic; Pyknosis; Necrosis; Karyolysis; Karyorrhexis; Inflammation.

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INTRODUCTION

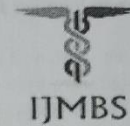
All living organisms are susceptible to environmental changes and none can escape from the hazardous effects of exposure to pollutants including radioisotopes and ionizing radiations. Increasing use of ionizing radiation for diagnostic as well as therapeutic purposes has drawn the attention of many radiobiologists towards the undesired side effects of such exposures.

Since there is a constant release of trace elements in unnaturally higher concentrations and often in unusual physio-chemical state, the fear of them being hazardous to human health is now an indisputable truth. Most of the pollution problems which we face today stem from the over exploitation of our natural resources and/or heedless disposal of waste materials in the environment. Once perpetuated in the environment, metals are not readily detoxified. Metallic (arsenic, Cadmium, chromium, lead and mercury) elements are considered systemic toxicants

that are known to induce multiple organ damage, even at lower levels of exposure¹.

Cadmium is a wide spread toxic pollutant of occupational and environmental concern because of its diverse effects; low rate of excretion from the body predominant storage in soft tissues². Cadmium has many applications example in batteries, pigments, plastics, metal coatings and widely used in electroplating³. Cadmium is adsorbed in significant quantities from cigarette smoke, food water and air contamination and is known to have numerous undesirable effects in both human and animals⁴⁻⁸. Cadmium-mediated is thought to involves multiple mechanisms, including DNA strand breakage and inhibition of DNA repair Cadmium induces p53-dependent G1/S and/or G2/M cell cycle arrest in various cell lines expressing tumor suppressor protein p53⁹⁻¹⁰.

It is not enough to know the effects of single agent because the presence of numerous pollutants results in a very complex network of interactions which often leads to an



"SURVEY ON THE PREVALENCE OF MOSQUITO BORNE DISEASE IN THE AREAS OF KOTA - RAJASTHAN"

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Abstract

The two major varieties are *Plasmodium falciparum* and *Plasmodium vivax*. *Plasmodium falciparum* is the most wide spread and dangerous of the four. Rajasthan also provides favourable environment to mosquitoes. Kota lies on latitude – 25°10' N & longitude – 75°50' with the intervention of Chambal river coming from Madhyapradesh and running throughout Kota city irrigating various rural areas via man made channels. Kota has also been a favourite place for mosquito breeding & hence a record of malaria & dengue cases reported are more from neighbouring Bundi (Roteda) & Kota city in comparison to other districts of Rajasthan. In Kota city maximum cases of malaria occur during August to October. The mosquitoes are more active in humid atmosphere. The rainy season falls between June to September. Rainfall provides water for mosquito breeding as well as increases humidity of the atmosphere for survival of the mosquitoes.

Key words: Mosquito-borne diseases, anopheline, mosquitoes and malaria.

Introduction:

Mosquitoes are ubiquitous in distribution and are found in all regions of world, except the regions near the two poles & altitudes beyond 2000 marks. There are 3500 species of mosquitoes, with a world wide population of more than 100 trillion, out of which most of them exist in tropical climate. "Mosquitoes are harmful", is largely true since mosquitoes are often incriminated to have been responsible for transmission of certain deadly diseases¹.

India is the home for about 320 species and 6 sub species of mosquito. Approximately 300 million people world wide are affected by malaria and about 1 to 1.2 million people die every year from malaria. In India mosquitoes have been known from very ancient times, having been cited in century old scriptures such as "Sushrut Samhita" which described them as a cause of both nuisance & human diseases. Mosquito borne disease are transmitted typically by the bite of an infected mosquito.² Different vectors carry different diseases such as malaria, dengue, chikunguniya, encephalitis, yellow fever, etc. which frequently occur in India & cause heavy morbidity and mortality annually, beside unprecedented economic and health burden. The dynamics of disease transmission by these vectors is governed by an array of factors such as climate change, environmental disturbances & several other man

made factors which include change in land use, population density, community hygiene & human behaviour. The developmental activities in the urban areas are very favourable for mosquito breeding. As a result malaria now is freely disseminated from urban areas to rural areas by the free movement of people to the big cities & towns in search of employment in various Industries, construction sites and other city development projects.³ Moving out of urban areas they carry the infection to rural areas. Rural migration leads to the establishment of "urban slums" with poor housing & sanitary conditions. These areas have heavy breeding potential of *Anopheles Stephensi*, *A. culifacies*, *Culex quinquefasciatus* & *Aedes aegypti*.

Malaria is caused by a protozoan parasite. These parasites are of four types –

1. *Plasmodium falciparum*
2. *Plasmodium vivax*.
3. *Plasmodium ovale*.
4. *Plasmodium malaria*⁴⁻⁷.

The two major varieties are *Plasmodium falciparum* and *Plasmodium vivax*. *Plasmodium falciparum* is the most wide spread and dangerous of the four. It causes severe form of malaria also known as cerebral malaria. If prompt treatment is not given the patient