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Annasaheb Magar Mahavidyalaya

Hadapsar, Pune- 411028

Affiliated to Savitribai Phule Pune University, Pune

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1. Title of Paper: Faunal Diversity of Divegaon, Purandar Taluka, Pune District, MS, India

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Faunal Diversity of Divegaon, Purandar Taluka, Pune District, M/S, India

Dr. Sharad Giramkar, Madhuri Sawant, Rupali Bhavsar, Dr. Anju Y. Mundhe*, Ajay Shinde, Shrutkirti Shukla, Divya Lande, Shubham Chavan, Ajit Ronge

Department of Zoology, Annasaheb Magar Mahavidyala, Hadpasar, Pune-411028, Maharashtra, India

ABSTRACT

Animal survey was conducted in Divegaon located in Purandar Taluka, Pune District, M/S, India. Divegaon is surrounded by Haveli Taluka towards west, Pune Taluka towards west, Bhor Taluka towards South, Khandala Taluka towards South. The total geographical area of village is 274.98 hectares. Survey area is about 585 meters above sea level. A checklist of 51 animals was prepared by walking survey method. Out of these, 11 animals belong to 8 families of phylum Arthropoda and 40 animals belong to 30 families of phylum Chordata.

Keywords: Insect, Reptiles, Birds, Mammals, Divegaon, Biodiversity.

I. INTRODUCTION

Most of the biodiversity hotspot are located in Maharashtra, India. The common animals found in Maharashtra are tiger, bison, Gawa, Neelgai, wild deer, sambar, crocodile, uncommon migratory birds etc. To safeguard these areas and market them as tourism attractions, the state has made appropriate steps to establish numerous wildlife parks and sanctuaries. Biodiversity is necessary for all species on Earth, including humans, to function properly. We cannot have healthy ecosystems that give us with the air we breathe and the food we consume without a diverse range of animals, plants, and microorganisms.

Biodiversity is necessary for maintaining ecological processes such as water cycle stabilization, soil fertility maintenance and replenishment, pollination and cross-fertilization of crops and other vegetation, soil erosion protection. The preservation of biological diversity leads to the preservation of vital ecological diversity, which is necessary for food chain continuance.

II. OBJECTIVES OF THE STUDY

The main objective of present study was to observe animal diversity in study area and to study key indicators species found in study area.

Author Name: Dr. Deshmukh D. J.

2. Title of Paper: Vikas Swarups Q and A from Print to Celluloid

Vol. LXIV, No. 1 (I), 2022 पुराणम् - Purana ISSN:0555-7860 13

VIKAS SWARUP'S *Q AND A* FROM PRINT TO CELLULOID

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Abstract

In the novel *Q and A* the role of destiny is more active than the film Slumdog Millionaire; this film is not mere replica of Vikas Swarup's *Q and A*. The book, titled *Q and A* is also a rags-to-riches story, where it talks about how the protagonist, Ram Mohammad Thomas, who is a tea stall waiter, wins the big prize on a TV game show. He is depicted in the novel as a man of all religious and thus the name. The film; although, it is based on the theme of the book; it has its own incomparable story line and deviates quite a bit from what has been written by the novelist.

Vikas Swarup, the author of *Q and A* was born in Allahabad, Uttar Pradesh in a family of lawyers. He studied various subjects like Psychology, History, and Philosophy. Swarup made his mark as a winner debater in National level competitions. After graduating with outstanding class, he joined the Indian Foreign Service (IFS) in 1986. Since August 2009, he is the Consul General of India in Osaka-Kobe, Japan. He wrote his first novel, Q&A, in two months, when he was appointed in London. The book was published in 2005. It has also been published in 42 languages. It was short listed for the Best First Book by the Commonwealth Writer's Prize and won South Africa's Exclusive Books Boeke Prize 2006 as well as the Paris Book Fair's Reader's Prize, the Prix Grand Public, in 2007. It was voted the Most Influential Book of 2008 in Taiwan, and winner of the Best Travel Read (Fiction) at the Heathrow Travel Product Award 2009. The film version of Q&A, titled 'Slumdog Millionaire', directed by Danny Boyle, took the world by storm, winning more than 70 awards including four Golden Globes, 7 BAFTAs and a staggering 8 Oscars, including Best Adapted Screenplay and Best Picture.

The novel *Q and A* is about an orphan boy who wins India's most famous quiz show Who Wants to Be a Millionaire? Each part, in the novel, closes with an inquiry for which Ram Mohammad Thomas replied in the quiz show indicate prior. He clarifies Smitha, the legal advisor who spares Ram Mohammad Thomas from the magistrate's evil treatment, how he knew the answers. She was requesting Ram to tell the fact about the quiz show.

"I have been arrested. For winning a quiz show." [1] (P.11)

Q and A is influential on vitality and its appealing, moving stories; Luck is another vital instrument in the procedure of the story in light of the fact that the up and upcoming incidents throughout Ram's life are forbidden by deciding fortunes in flipping the fortunate coin unfortunately having 'head' at the two sides. The plot of the novel interlinks the occurrences with the growing up or transitioning of Ram Mohammed Thomas as a rising star of the novel. The titles of the sum total of what parts have been given based on the thoughts of the inquiries asked in test appear and the disclosure of the appropriate response without considerably legitimate training. The transitioning of protagonist uncovers through the sections' titles featuring the expanding measure

Author Name: Dr. Deshmukh D. J.

3. Title of Paper: Protrayl Experiences in Jhumpa Lahiri's "in Other Words

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PROTRAYAL OF EXILIC EXPERIENCES IN JHUMPA LAHIRI'S "IN OTHER WORDS"

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Assistant Professor, Department of English, A. M. College, Hadapsar, Pune-411028.

Abstract
For centuries there has been enormous in migration and it reaches at its new apex due to globalization, internationalization and the act of migration is a production of self-imposed or forced emigration and it acutely underlines socially, politically place of refugees, exiled population. The exiled or dispersed communities are destined to the former homeland and they even feel a sense of isolation in alien land and Indian writers and poets portray this picture in their writing. Many Indian diasporic writers discover various themes such as, issues of migration, self-exploration, self identity, exilic experiences, and cultural differences in their writing. Jhumpa Lahiri has been writing for a few years on migration very effectively as a voice of Indian migrants. The prime aim of research paper is to display the deep layer of diasporic consciousness from the perspectives of Jhumpa Lahiri in the novel In the Other Words and the research paper also attempts to analyze exilic experiences and linguistic identity.
Keywords: Exile; longing for homeland; past memories: boundary restoration; restoration of homeland.

Introduction

Context of EXILE:

Exile is frequently referred to various national, cultural, religious and political groups and people. It was originally used for the Jews, dispersed after the Babylonian imprisonment and then with the passage of the time for the Jews living outside Israel or the dispersed among Gentiles. Jewish experience with exile started in the late 8th century. Etymologically the term 'Exile' is resonant with the ideas of forced emigration, displacement, social and political marginalization of an individual or a group of refugees. It aligns to experiences of loneliness, foreignness, homesickness and an enduring longing to remigrate to the place of origin. Generally Exile denotes mass deportation or banishment as a means of punishment. The term Exile is interchangeably called as Diaspora. So Exile refers to either self imposed emigration or forced displacement from origin country to another country.

Jhumpa Lahiri is one of the gigantic figures in Indian diasporic writing. She has written well acclaimed books. Her writing mostly talks the untold stories of Indian migrants. As being a second-generation diasporic writer she is keeping the flame of migrants' issues. She heavily pays concentration to mapping the nostalgic state of migrants, their isolation, and their voices. She has penned two short story collections and two noted novels. She grew up at Rhode Island in America. Jhumpa Lahiri is known as a foremost diasporic writer despite dwelling in America. She presents Indian culture, homeland and language in her writings. In the novel, a bitter journey of narrator

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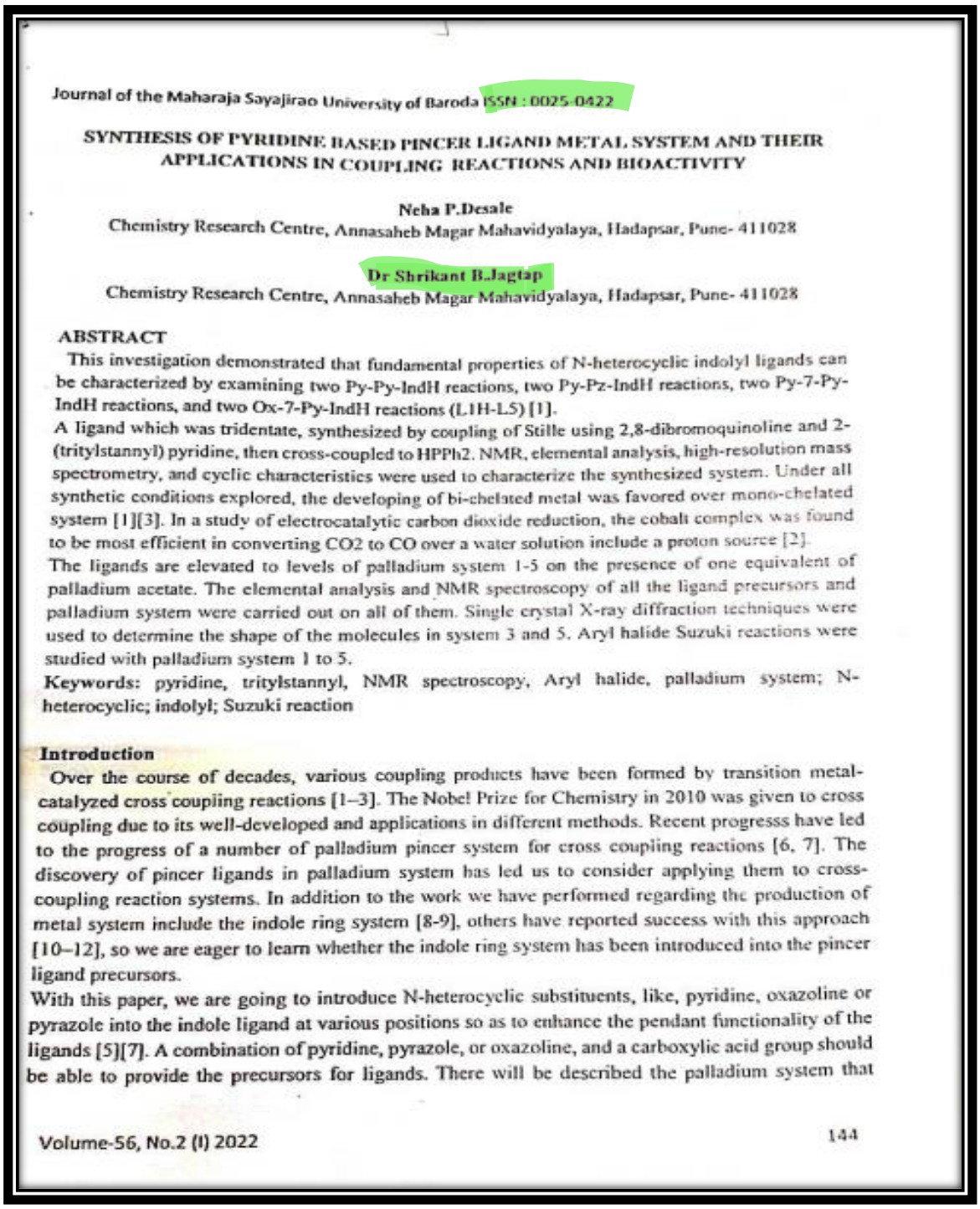
Author Name: Dr. Jagtap S. B.

4. Title of Paper: Synthesis of Pyrimidine Based Pincer Ligand Metal System and their Application in Coupling Reagents and Bioactivity



Journal of the Maharaja Sayajirao University of Baroda ISSN : 0025-0422

SYNTHESIS OF PYRIDINE BASED PINCER LIGAND METAL SYSTEM AND THEIR APPLICATIONS IN COUPLING REACTIONS AND BIOACTIVITY

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ABSTRACT

This investigation demonstrated that fundamental properties of N-heterocyclic indolyl ligands can be characterized by examining two Py-Py-IndH reactions, two Py-Pz-IndH reactions, two Py-7-Py-IndH reactions, and two Ox-7-Py-IndH reactions (L1H-L5) [1].

A ligand which was tridentate, synthesized by coupling of Stille using 2,8-dibromoquinoline and 2-(tritylstannyl) pyridine, then cross-coupled to HPPh2. NMR, elemental analysis, high-resolution mass spectrometry, and cyclic characteristics were used to characterize the synthesized system. Under all synthetic conditions explored, the developing of bi-chelated metal was favored over mono-chelated system [1][3]. In a study of electrocatalytic carbon dioxide reduction, the cobalt complex was found to be most efficient in converting CO2 to CO over a water solution include a proton source [2].

The ligands are elevated to levels of palladium system 1-5 on the presence of one equivalent of palladium acetate. The elemental analysis and NMR spectroscopy of all the ligand precursors and palladium system were carried out on all of them. Single crystal X-ray diffraction techniques were used to determine the shape of the molecules in system 3 and 5. Aryl halide Suzuki reactions were studied with palladium system 1 to 5.

Keywords: pyridine, tritylstannyl, NMR spectroscopy, Aryl halide, palladium system; N-heterocyclic; indolyl; Suzuki reaction

Introduction

Over the course of decades, various coupling products have been formed by transition metal-catalyzed cross coupling reactions [1–3]. The Nobel Prize for Chemistry in 2010 was given to cross coupling due to its well-developed and applications in different methods. Recent progresss have led to the progress of a number of palladium pincer system for cross coupling reactions [6, 7]. The discovery of pincer ligands in palladium system has led us to consider applying them to cross-coupling reaction systems. In addition to the work we have performed regarding the production of metal system include the indole ring system [8-9], others have reported success with this approach [10–12], so we are eager to learn whether the indole ring system has been introduced into the pincer ligand precursors.

With this paper, we are going to introduce N-heterocyclic substituents, like, pyridine, oxazoline or pyrazole into the indole ligand at various positions so as to enhance the pendant functionality of the ligands [5][7]. A combination of pyridine, pyrazole, or oxazoline, and a carboxylic acid group should be able to provide the precursors for ligands. There will be described the palladium system that

Author Name: Dr. Mundhe A. Y.

5. Title of Paper: Faunal Diversity of Divegaon, Purandar Taluka, Pune6District, MS, India

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Keywords: Insect, Reptiles, Birds, Mammals, Divegaon, Biodiversity.

I. INTRODUCTION

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Biodiversity is necessary for maintaining ecological processes such as water cycle stabilization, soil fertility maintenance and replenishment, pollination and cross-fertilization of crops and other vegetation, soil erosion protection. The preservation of biological diversity leads to the preservation of vital ecological diversity, which is necessary for food chain continuance.

II. OBJECTIVES OF THE STUDY

The main objective of present study was to observe animal diversity in study area and to study key indicators species found in study area.

Author Name: Dr. Giramkar S. V.

6. Title of Paper: Impact of Environmental Changes on Preschool Children in Purandar Tehsil, M/S, India

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IMPACT OF ENVIRONMENTAL CHANGES ON PRESCHOOL CHILDREN IN PURANDAR TEHSIL, M/S, INDIA

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Abstract:
This article reported the effect of environmental changes on high prevalence of vitamin A deficiency (VAD) diseases such as Bitot's spot, conjunctival xerosis, night blindness, and xerophthalmia. A pre-school survey was carried out in rural areas of Purandar Tehsil. The aim of study was to assess the impact of the environment on health related problems among the rural preschool children. Clinical examinations were carried out on 582 preschool children for various health issues. The survey revealed 10.3% prevalence of VAD with 1.9% Night blindness, 2.7% xerophthalmia, 2.8% Bitot's spots and 2.9% conjunctival xerosis. Bitot's spots were noted in the conjunctiva of eyes located in the temporal portion of cornea. These Bitot's spots were typically triangular keratinized spots. The lesions of Bitot's spots were dry patches not wetted by tears. The other health issues observed were 5.8% of preschool children were affected by skin infections and 3.7% scleral melanocytosis with blackish blue-gray colored pigmentation in the white portion of the eyes with normal vision was recorded in the present study.
Key Words: Environment, Preschool children, vitamin D deficiency, Bitot's spots, Scleral melanocytosis, skin diseases.

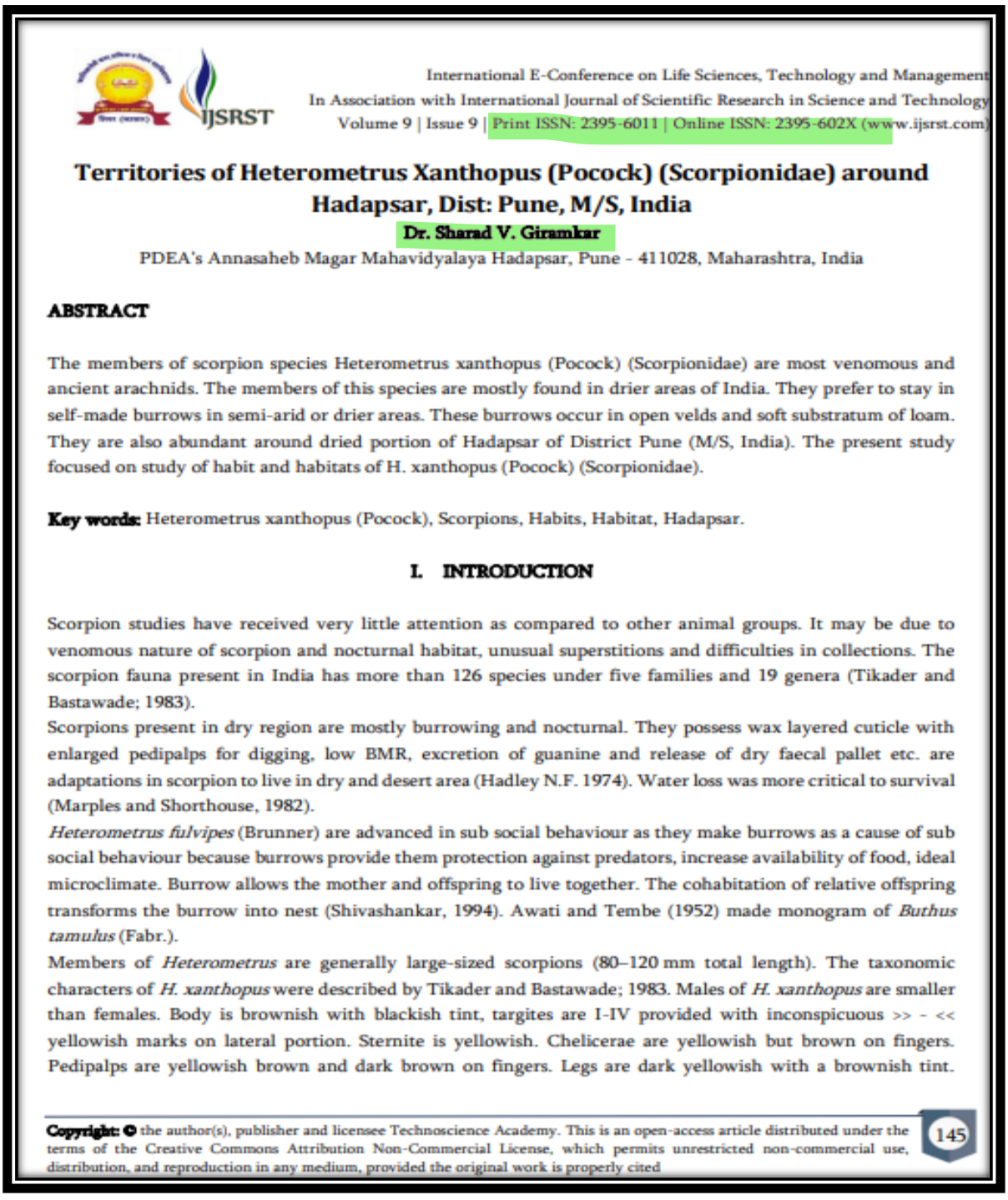
Introduction:
Climate change is the major issue in India and it causes effects on the health of preschool children. The children with age group of one to seven are suffering from vitamin A deficiency including symptoms of Night blindness, xerophthalmia, Bitot's spots and conjunctival xerosis along with other diseases such as scleral melanocytosis, skin disease etc. Vitamin A deficiency is a major problem in public health nutrition in India. The prevalence of Bitot's spot recommended by the WHO in rural pre-school children of India is 0.5% (NNMB 2003). VAD is required in adequate amounts for normal vision and immunity and it also helps in cellular growth and development (Amare Tariku et.al. 2016). VAD is a major nutritional problem in lower income countries. Deficiency of VAD causes xerophthalmia ranging from milder stages of night blindness and Bitot's spots to severe corneal xerosis or sometimes complete blindness (Zekariyas Sahile et.al. 2020). In Urban Central India it was found that 6.5% of children were suffering from xerophthalmia (Dr. Sinha et al., 2011). Appearance of patchy gray, bluish black discoloration in the sclera of the eye indicates scleral melanocytosis (Bang P., 2015). Most preschool children suffer from skin diseases and most of the common skin diseases were infections (Kabir Sardana et. al., 2019). So, it was an urgent need to carry out a health survey of children in rural areas in Maharashtra.

Rationale of the study:
Study area is located in the southern portion of Pune city with air pollution and fluctuation of rainfall. This area is a hill region with high humidity with poor sanitation. There was an urgent need to carry out a health survey of children.

Objectives:
The main objective of study was to assess the impact of the environment on health related problems among the rural preschool children.

Author Name: Dr. Giramkar S. V.

7. Title of Paper: Territories of Heterometrus xanthopus (Pocock) (Scorpionidae) Around Hadapsar, Dist. Pune, M/S, India



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Territories of Heterometrus Xanthopus (Pocock) (Scorpionidae) around Hadapsar, Dist: Pune, M/S, India

Dr. Sharad V. Giramkar
PDEA's Annasaheb Magar Mahavidyalaya Hadapsar, Pune - 411028, Maharashtra, India

ABSTRACT

The members of scorpion species Heterometrus xanthopus (Pocock) (Scorpionidae) are most venomous and ancient arachnids. The members of this species are mostly found in drier areas of India. They prefer to stay in self-made burrows in semi-arid or drier areas. These burrows occur in open velds and soft substratum of loam. They are also abundant around dried portion of Hadapsar of District Pune (M/S, India). The present study focused on study of habit and habitats of H. xanthopus (Pocock) (Scorpionidae).

Key words: Heterometrus xanthopus (Pocock), Scorpions, Habits, Habitat, Hadapsar.

I. INTRODUCTION

Scorpion studies have received very little attention as compared to other animal groups. It may be due to venomous nature of scorpion and nocturnal habitat, unusual superstitions and difficulties in collections. The scorpion fauna present in India has more than 126 species under five families and 19 genera (Tikader and Bastawade; 1983).

Scorpions present in dry region are mostly burrowing and nocturnal. They possess wax layered cuticle with enlarged pedipalps for digging, low BMR, excretion of guanine and release of dry faecal pallet etc. are adaptations in scorpion to live in dry and desert area (Hadley N.F. 1974). Water loss was more critical to survival (Marples and Shorthouse, 1982).

Heterometrus fulvipes (Brunner) are advanced in sub social behaviour as they make burrows as a cause of sub social behaviour because burrows provide them protection against predators, increase availability of food, ideal microclimate. Burrow allows the mother and offspring to live together. The cohabitation of relative offspring transforms the burrow into nest (Shivashankar, 1994). Awati and Tembe (1952) made monogram of *Buthus tamulus* (Fabr.).

Members of *Heterometrus* are generally large-sized scorpions (80–120 mm total length). The taxonomic characters of *H. xanthopus* were described by Tikader and Bastawade; 1983. Males of *H. xanthopus* are smaller than females. Body is brownish with blackish tint, targites are I-IV provided with inconspicuous >> - << yellowish marks on lateral portion. Sternite is yellowish. Chelicerae are yellowish but brown on fingers. Pedipalps are yellowish brown and dark brown on fingers. Legs are dark yellowish with a brownish tint.

Author Name: Prof. Bhavsar R. R.

8. Title of Paper: Faunal Diversity of Divegaon, Purandar Taluka, Pune District, MS, India

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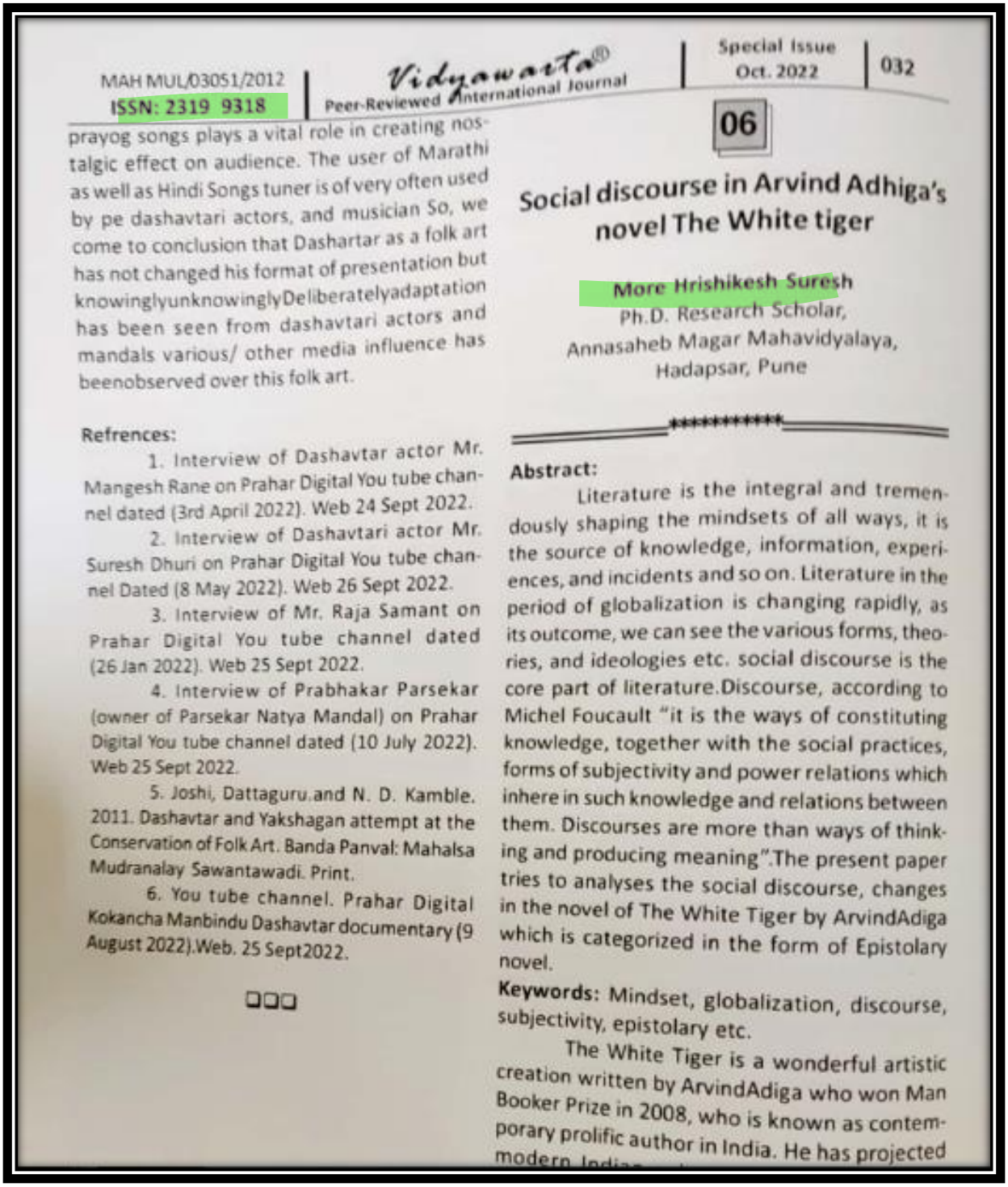
Author Name: Prof. More H.S.

9 Title of Paper: Social Discourse in Arvind Adhiga's Novel the White Tiger



prayog songs plays a vital role in creating nostalgic effect on audience. The user of Marathi as well as Hindi Songs tuner is of very often used by pe dashavtari actors, and musician So, we come to conclusion that Dashartar as a folk art has not changed his format of presentation but knowinglyunknowinglyDeliberatelyadaptation has been seen from dashavtari actors and mandals various/ other media influence has beenobserved over this folk art.

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❑❑❑

06

Social discourse in Arvind Adhiga's novel The White tiger

More Hrishikesh Suresh
Ph.D. Research Scholar,
Annasaheb Magar Mahavidyalaya,
Hadapsar, Pune

Abstract:

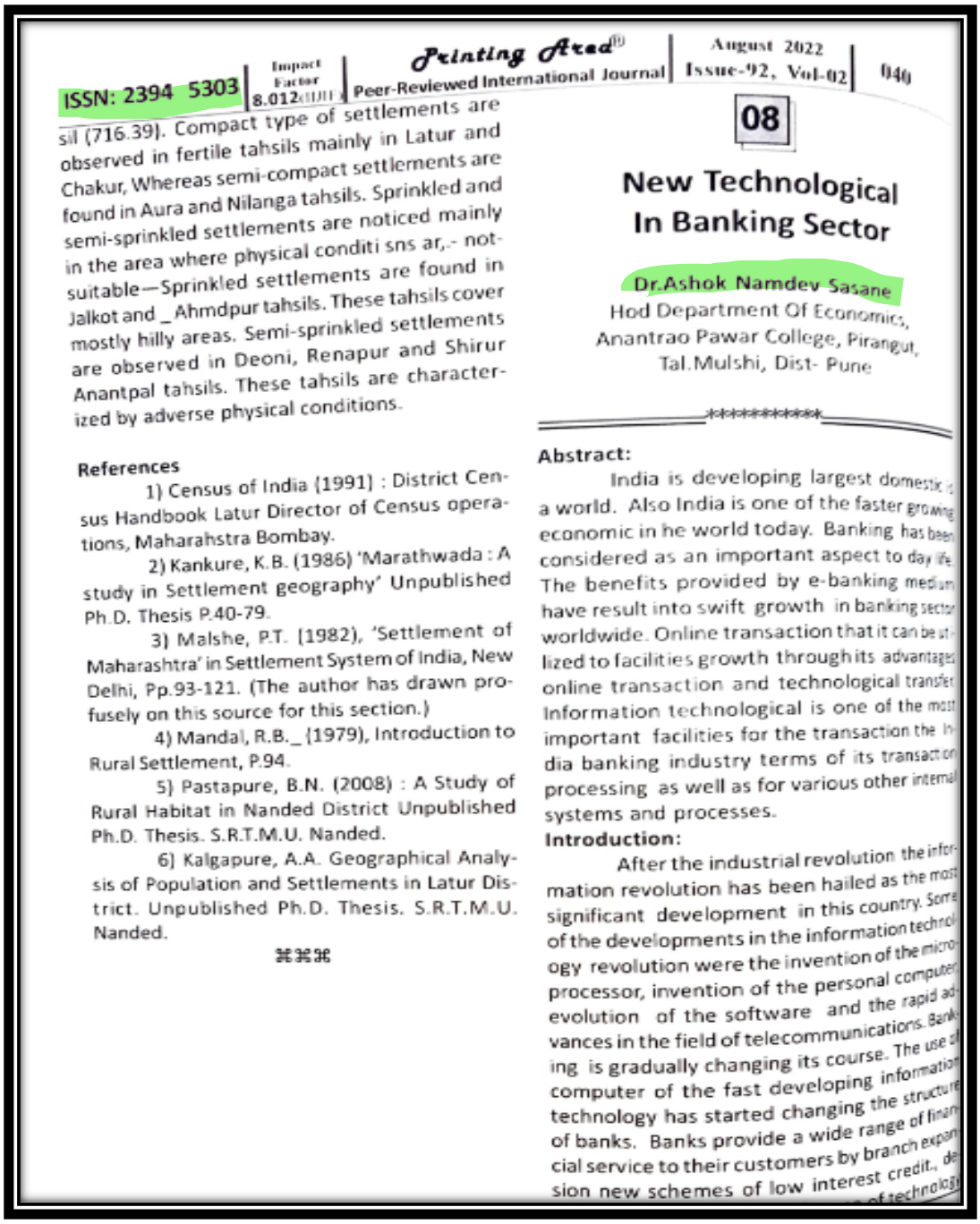
Literature is the integral and tremendously shaping the mindsets of all ways, it is the source of knowledge, information, experiences, and incidents and so on. Literature in the period of globalization is changing rapidly, as its outcome, we can see the various forms, theories, and ideologies etc. social discourse is the core part of literature.Discourse, according to Michel Foucault "it is the ways of constituting knowledge, together with the social practices, forms of subjectivity and power relations which inhere in such knowledge and relations between them. Discourses are more than ways of thinking and producing meaning".The present paper tries to analyses the social discourse, changes in the novel of The White Tiger by ArvindAdiga which is categorized in the form of Epistolary novel.

Keywords: Mindset, globalization, discourse, subjectivity, epistolary etc.

The White Tiger is a wonderful artistic creation written by ArvindAdiga who won Man Booker Prize in 2008, who is known as contemporary prolific author in India. He has projected modern Indian

Author Name: Dr. Sasane A. N.

10. Title of Paper: New Technology in Banking Sector



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sil (716.39). Compact type of settlements are observed in fertile tahsils mainly in Latur and Chakur, Whereas semi-compact settlements are found in Aura and Nilanga tahsils. Sprinkled and semi-sprinkled settlements are noticed mainly in the area where physical conditi sns ar,- not-suitable—Sprinkled settlements are found in Jalkot and _Ahmdpur tahsils. These tahsils cover mostly hilly areas. Semi-sprinkled settlements are observed in Deoni, Renapur and Shirur Anantpal tahsils. These tahsils are character-ized by adverse physical conditions.

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08

New Technological In Banking Sector

Dr.Ashok Namdev Sasane
Hod Department Of Economics,
Anantrao Pawar College, Pirangut,
Tal.Mulshi, Dist- Pune

Abstract:

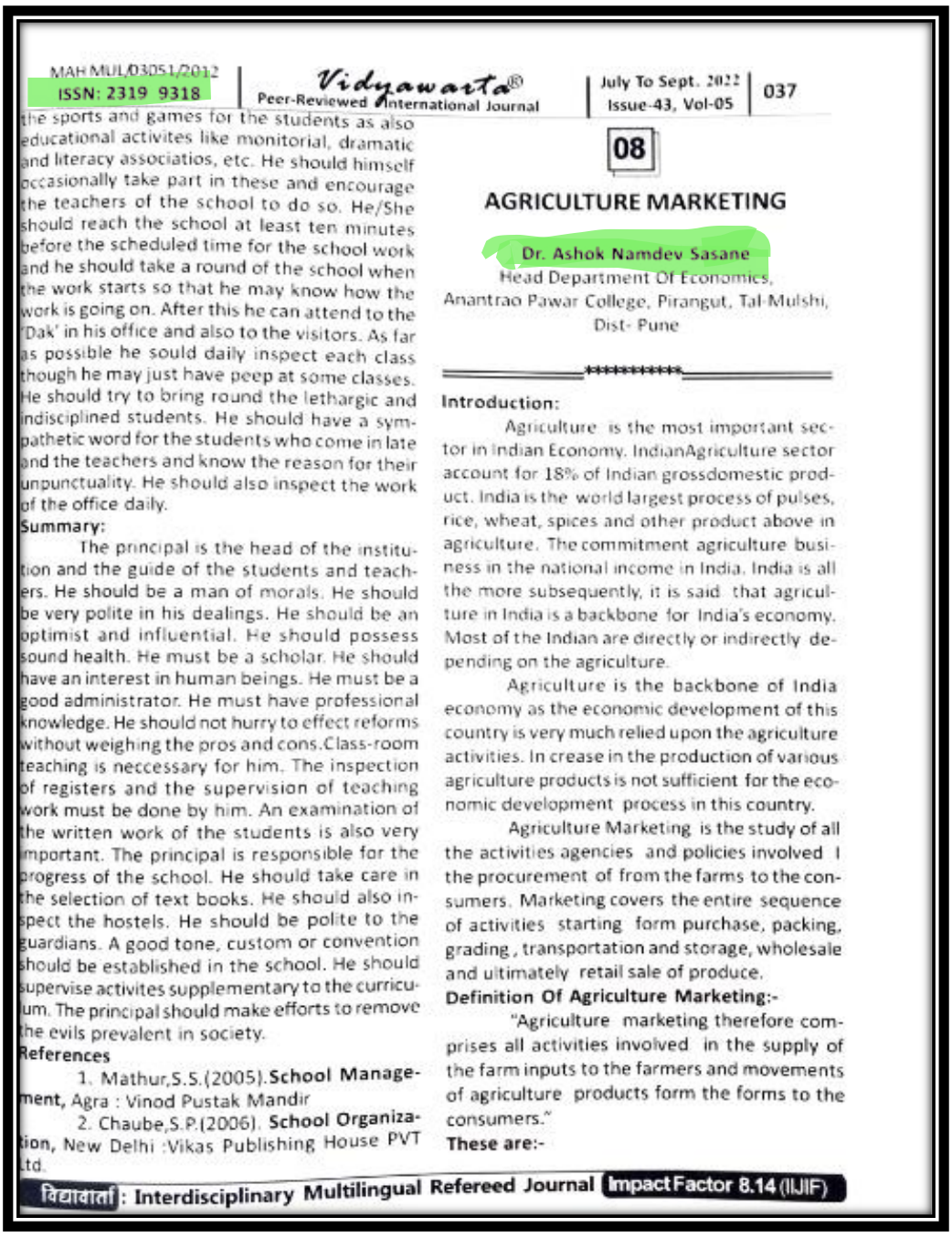
India is developing largest domestic a world. Also India is one of the faster growing economic in he world today. Banking has been considered as an important aspect to day life. The benefits provided by e-banking medium have result into swift growth in banking sector worldwide. Online transaction that it can be ut-lized to facilities growth through its advantages online transaction and technological transfer. Information technological is one of the most important facilities for the transaction the In-dia banking industry terms of its transaction processing as well as for various other internal systems and processes.

Introduction:

After the industrial revolution the infor-mation revolution has been hailed as the most significant development in this country. Some of the developments in the information technol-ogy revolution were the invention of the micro-processor, invention of the personal computer evolution of the software and the rapid ad-vances in the field of telecommunications. Bank-ing is gradually changing its course. The use of computer of the fast developing information technology has started changing the structure of banks. Banks provide a wide range of finan-cial service to their customers by branch expan-sion new schemes of low interest credit., de-

Author Name: Dr. Sasane A. N.

11. Title of Paper: Agriculture Marketing



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037

the sports and games for the students as also educational activites like monitorial, dramatic and literacy associatios, etc. He should himself occasionally take part in these and encourage the teachers of the school to do so. He/She should reach the school at least ten minutes before the scheduled time for the school work and he should take a round of the school when the work starts so that he may know how the work is going on. After this he can attend to the 'Dak' in his office and also to the visitors. As far as possible he sould daily inspect each class though he may just have peep at some classes. He should try to bring round the lethargic and indisciplined students. He should have a sympathetic word for the students who come in late and the teachers and know the reason for their unpunctuality. He should also inspect the work of the office daily.

Summary:

The principal is the head of the institution and the guide of the students and teachers. He should be a man of morals. He should be very polite in his dealings. He should be an optimist and influential. He should possess sound health. He must be a scholar. He should have an interest in human beings. He must be a good administrator. He must have professional knowledge. He should not hurry to effect reforms without weighing the pros and cons.Class-room teaching is neccessary for him. The inspection of registers and the supervision of teaching work must be done by him. An examination of the written work of the students is also very important. The principal is responsible for the progress of the school. He should take care in the selection of text books. He should also inspect the hostels. He should be polite to the guardians. A good tone, custom or convention should be established in the school. He should supervise activites supplementary to the curriculum. The principal should make efforts to remove the evils prevalent in society.

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08

AGRICULTURE MARKETING

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Dist- Pune

Introduction:

Agriculture is the most important sector in Indian Economy. IndianAgriculture sector account for 18% of Indian grossdomestic product. India is the world largest process of pulses, rice, wheat, spices and other product above in agriculture. The commitment agriculture business in the national income in India. India is all the more subsequently, it is said that agriculture in India is a backbone for India's economy. Most of the Indian are directly or indirectly depending on the agriculture.

Agriculture is the backbone of India economy as the economic development of this country is very much relied upon the agriculture activities. In crease in the production of various agriculture products is not sufficient for the economic development process in this country.

Agriculture Marketing is the study of all the activities agencies and policies involved I the procurement of from the farms to the consumers. Marketing covers the entire sequence of activities starting form purchase, packing, grading , transportation and storage, wholesale and ultimately retail sale of produce.

Definition Of Agriculture Marketing:-

"Agriculture marketing therefore comprises all activities involved in the supply of the farm inputs to the farmers and movements of agriculture products form the forms to the consumers."

These are:-

Author Name: Prof Sawant M. R.

12. Title of Paper: Faunal Diversity of Divegaon, Purandar Taluka, Pune District, MS, India

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In Association with International Journal of Scientific Research in Science and Technology
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Faunal Diversity of Divegaon, Purandar Taluka, Pune District, M/S, India

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Department of Zoology, Annasaheb Magar Mahavidyala, Hadpasar, Pune-411028, Maharashtra, India

ABSTRACT

Animal survey was conducted in Divegaon located in Purandar Taluka, Pune District, M/S, India. Divegaon is surrounded by Haveli Taluka towards west, Pune Taluka towards west, Bhor Taluka towards South, Khandala Taluka towards South. The total geographical area of village is 274.98 hectares. Survey area is about 585 meters above sea level. A checklist of 51 animals was prepared by walking survey method. Out of these, 11 animals belong to 8 families of phylum Arthropoda and 40 animals belong to 30 families of phylum Chordata.

Keywords: Insect, Reptiles, Birds, Mammals, Divegaon, Biodiversity.

I. INTRODUCTION

Most of the biodiversity hotspot are located in Maharashtra, India. The common animals found in Maharashtra are tiger, bison, Gawa, Neelgai, wild deer, sambar, crocodile, uncommon migratory birds etc. To safeguard these areas and market them as tourism attractions, the state has made appropriate steps to establish numerous wildlife parks and sanctuaries. Biodiversity is necessary for all species on Earth, including humans, to function properly. We cannot have healthy ecosystems that give us with the air we breathe and the food we consume without a diverse range of animals, plants, and microorganisms.

Biodiversity is necessary for maintaining ecological processes such as water cycle stabilization, soil fertility maintenance and replenishment, pollination and cross-fertilization of crops and other vegetation, soil erosion protection. The preservation of biological diversity leads to the preservation of vital ecological diversity, which is necessary for food chain continuance.

II. OBJECTIVES OF THE STUDY

The main objective of present study was to observe animal diversity in study area and to study key indicators species found in study area.

Author Name: Dr. Shelke P. N.

13. Title of Paper: Synthesis and Characterization of Single Crystalline Germanium Nanowire

GORTERIA JOURNAL

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Synthesis and characterization of single crystalline Germanium nanowires

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1 Hon. Balasaheb Jadhav Arts, Commerce and Science college, Ale
2 Department of Physics, Dr. B. N. Purandare Arts, Smt. S. G. Gupta Commerce and Smt. S. A. Mithaiwala Science college, Lonavala, India
3 Annasaheb Magar Mahavidyalaya, Hadapsar, Pune
4 SNJB's KKHA Arts, SMGL Commerce and SPHJ Science College,

Abstract: One-dimensional (1D) Ge nanostructures such as single crystalline nanowires have attracted intense research zeal in the past decade as compared to its bulk form, owing to their wide range of potential applications in sensing, biology, optoelectronics, solar cells and photocatalysis. In this work, by optimizing the experimental conditions using simple vapor transport method, single crystalline germanium nanowires with lowest diameter were successfully synthesized and characterized.

Keywords: Germanium, Nanowires, single crystalline, Nanostructures

Author Name: Prof. Deshpande M. V

14. Title of Paper: Utilization of Trash Fish Solid Waste as Peptone for Potential Bacterial Growth

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Utilization of trash fish solid waste as peptone for potential bacterial growth.

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Department of Microbiology, PDEA s AnnasahebMagarMahavidyalaya, Pune, India

ABSTRACT

Peptone is a protein hydrolysate prepared by partial proteolytic digestion of protein source. It is an excellent natural source of amino acids, peptides and proteins in growth media and hence, serves as a nitrogen and sometimes carbon source. Also, in medium it acts as a buffer because of its amphoteric nature. The commercial peptone has high market value. Large amount of fish waste is generated daily in fish market which is difficult to dispose. Fish waste can be used as nutrient source for microbial growth as it contains calcium, protein, vitamins, iron and minerals. This new approach can reduce environmental problems associated with the waste disposal. Present study deals with the production of peptone from fish waste which can be used at laboratory level. Fish waste of *Tilapia busumana* (Chilapi), *Rastrelliger kanagurta* (Bangada), *Porthecle dinus* (Dinus) were used for peptone production by alkaline hydrolysis and acid hydrolysis method. The protein content was measured using Folin-Lowry method. It was observed that fish waste of *R. kanagurta* has high protein content. Growth curve studies using commercial peptone and peptone from fish waste were done on *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas fluorescence*, *Staphylococcus aureus*, and *Klebsiella* spp.

Keywords: Fish waste, Peptone, Alkaline hydrolysis, Acid hydrolysis, Growth curve.

INTRODUCTION

India is a major producer of fish. In 2013-14, India holds second ranks in the world after China; contributing to 5.68% of global fish production. The country has a long coastline of 8118 km and inland fishery resource include 1.96 lakh km stretch of rivers and canals, 29.07 lakh hector reservoirs 24.40 lakh hector ponds and tanks (Handbook on Fisheries Statistic, 2014). In recent years, total fish production is 9.58 million metric tons with a contribution of 6.14 million metric tons from inland

Author Name: Dr. Sonawale V. S.

15.Title of Paper: Sant Tukaramncya Abhangatil Samajikta

B.Aadhar' Peer-Reviewed & Refereed Indexed Multidisciplinary International Research Journal

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ISSN : 2278-9308 October, 2022

संत तुकारामांच्या अभंगांतील सामाजिकता

प्रा. वंदना वसंत सोनवले

अण्णासाहेब मगर महाविद्यालय, हडपसर.,दूरभाष्य :8308976993

प्रास्ताविक :

महाराष्ट्राला खूप मोठी संत परंपरा लाभली आहे. संत ज्ञानेश्वर ,संत नामदेव, संत एकनाथ ,संत तुकाराम यांचा मोठा प्रभाव मराठी जनसामान्यांच्या मनावर आजही पडलेला दिसतो. ज्या ज्ञानेश्वरांनी भागवत धर्माचा पाया घातला त्याच भागवत धर्माचा कळस रचण्याचे काम संत तुकारामांनी केले आहे. या संतांनी भक्ती चळवळीतून जनसामान्यांचे प्रबोधन केले आहे. आजच्या आधुनिक काळात समाजातील अस्थिरता नाहीशी करण्यासाठी संतांच्या विचारांची गरज आहे. समाजातील जातीय व धार्मिक तणाव संपविण्याचे काम संतांचे विचार करू शकतात. धर्म, जात या आजच्या संघर्षाच्या काळात या संत परंपरेकडे सर्वांचे लक्ष वेधले गेले पाहिजे . या संतांच्या विचारात समाज एकोप्याचा संदेश दिलेला दिसतो. जात - पात, धर्मभेद हे मुद्दे येथे गळून पडतात. भागवत धर्माने शिकवलेली भक्ती ही सामाजिक असलेली दिसते.

मराठी साहित्याचा उगम तेराव्या शतकातील संत साहित्यापासून झाला असल्याचे दिसते. त्यामुळे संत साहित्याला मराठी साहित्याचा मुख्य प्रवाह आहे असे मानता येईल. भागवत धर्माची पताका हातामध्ये घेऊन प्रबोधनाचा दिवा संतांनी सतत तेवत ठेवून समाजाला प्रगतीच्या दिशेने वाटचाल करण्यास भाग पाडले. भक्तीबरोबरच समाजवर्तनाचे सूत्र संतांनी मांडलेले दिसते. यामध्ये संत तुकारामांच्या अभंगाने मराठी माणसांच्या मनावर अधिराज्य गाजवले आहे. कारण तुकारामांच्या अभंगांमध्ये सामान्य माणसांच्या जगण्याचे विविध संदर्भ मांडले आहेत. त्यांच्या अभंगांमध्ये लोकसंस्कृती , लोकपरंपरा , जगण्याचे आचार-विचार, नीती संकल्पना यांचे समाजशास्त्र आहे म्हणून त्यांचे अभंग श्रेष्ठ ठरतात.

तुकारामांच्या अभंगातील समाजजीवन वाचकाला थक्क करते . समाज मनाशी असलेले नाते त्यांच्या अभंगातून त्यांनी सहज व्यक्त केलेले आहे. आजच्या विज्ञानाच्या युगात माणसाला अनेक भौतिक सुखे मिळाली ,पण तो समाधानी दिसत नाही. तुकारामांचे अभंग हे जगण्यातील आनंद मिळवून देतात. जीवनावर प्रेम करायला शिकवतात . मानवी जीवनावर निष्ठा , प्रेम , समाधान , सुख, शांती आणि माणूसकी ही जीवनमूल्ये तुकारामांच्या अभंगातून येतात. त्यामुळे तुकारामांचे अभंग हे आजही जीवन प्रेरक आहेत. म्हणून आजच्या काळातही ते जवळचे वाटतात. त्यांचे अभंग जीवनाचे आचार सूत्र मांडतात. समाजातील चांगली-वाईट, सज्जन -दुर्जन, दुष्ट -लोभी, कर्मठ - दांभिक वृत्तीची माणसे त्यांच्या अभंगातून चित्रण केलेली दिसतात . समाजजीवनाचे व्यापक चित्रण ते अनुभवातून मांडतात. त्यामुळे संत तुकारामांचे अभंग इतर संत साहित्यपेक्षा वेगळे ठरतात.

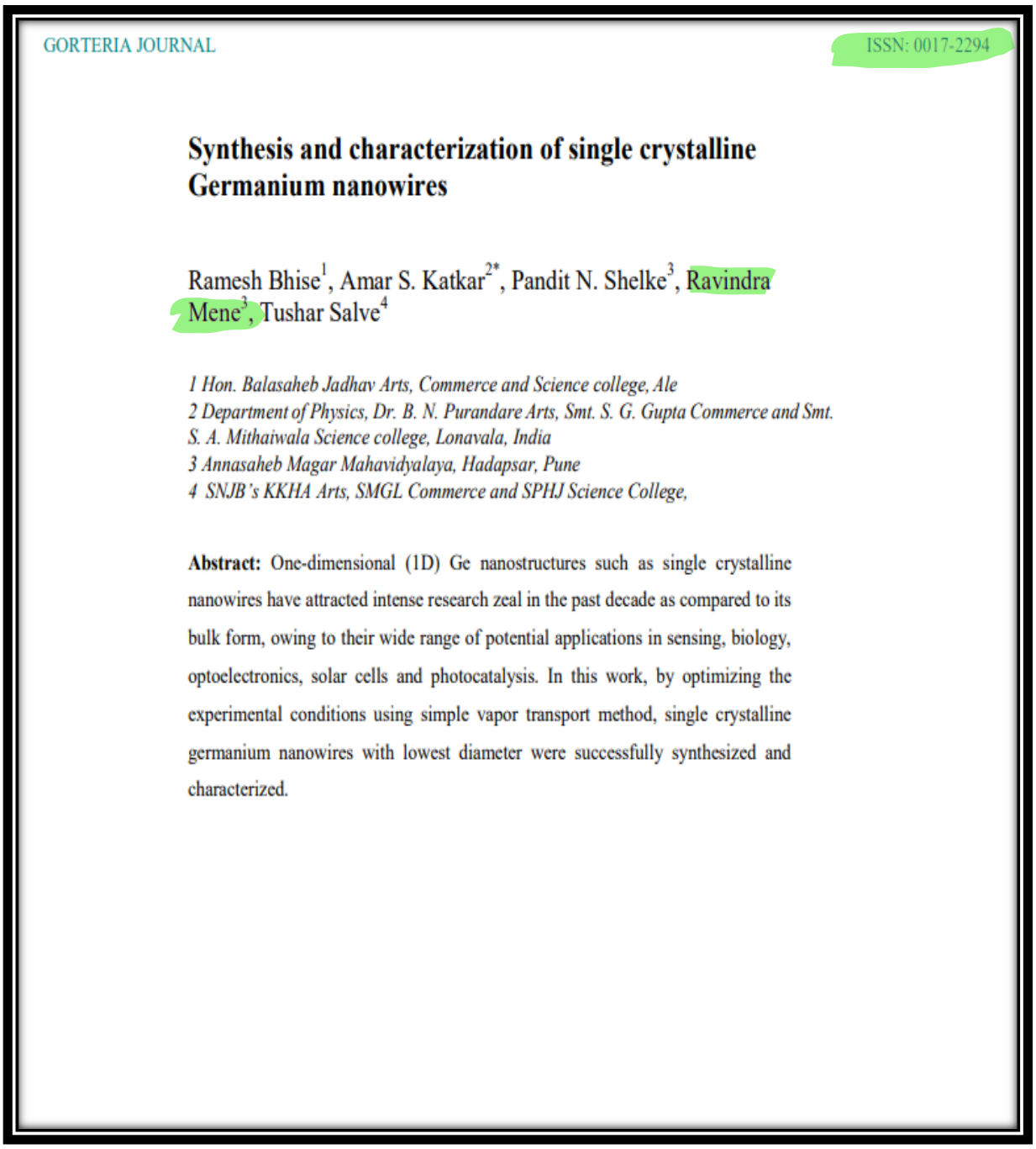
समाजातील अनाचार, भ्रष्टाचार पाहून ते उद्विग्न होतात. समाजातील अनैतिकतेवरच तुकाराम महाराज प्रकाश टाकतात.

'पापाची वासना नको दावूं डोळा ।
त्याहुनी आंधळा बराच मी ।।
निंदेचे श्रवण नको माझे कानी ।
बधीर करोनी ठेवी देवा ।।१।।'

वाईट गोष्टींचा त्याग स्वतःपासून करून चांगले कसे वागावे हे त्यांच्या व्यक्तिमत्त्वाने दाखवून समाजाला आदर्श घालून दिला. तुकारामांचे अभंग हे जनसामान्यांच्या जगण्याला आत्मभान देतात. मानवी जीवनाच्या सर्व व्यवहारांना त्यांचे अभंग कवेत घेताना दिसतात. ते मानवी जीवनाला केंद्रस्थानी ठेवून विचार करतात. 'साहित्य हे सामाजिक जीवनाचा आरसा आहे असे म्हटले जाते' हेच सामाजिक जीवन त्यांच्या अभंगातून आलेले आहे.

Author Name: Dr. Mene R. U.

16. Title of Paper: Synthesis and Characterization of Single Crystalline Germanium Nanowire



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Synthesis and characterization of single crystalline Germanium nanowires

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2 Department of Physics, Dr. B. N. Purandare Arts, Smt. S. G. Gupta Commerce and Smt. S. A. Mithaiwala Science college, Lonavala, India
3 Annasaheb Magar Mahavidyalaya, Hadapsar, Pune
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Abstract: One-dimensional (1D) Ge nanostructures such as single crystalline nanowires have attracted intense research zeal in the past decade as compared to its bulk form, owing to their wide range of potential applications in sensing, biology, optoelectronics, solar cells and photocatalysis. In this work, by optimizing the experimental conditions using simple vapor transport method, single crystalline germanium nanowires with lowest diameter were successfully synthesized and characterized.

Author Name: Prof. Waghmode M. S.

17. Title of Paper: Primary studies on Biotransformation of Steroidal Drug Prednisolone

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Research Article

Primary studies on biotransformation of steroidal drug Prednisolone

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(Received: 19 October 2021; Revised: 01 March 2022; Accepted: 01 March 2022)

Abstract

The less biodegradable steroidal drug, Prednisolone is one of the widely used drugs in the treatment of autoimmune and infectious diseases. Transformation of prednisolone can be achieved with microbial activity. Isolation of prednisolone-resistant microorganisms was done using a sewage sample. Out of 5 isolates, one isolate was selected for further studies based on maximum tolerability to prednisolone. The isolate was identified based on MALDI-TOF. The strain was found to have a match score of 2.336 with gram-negative bacteria *Klebsiella pneumoniae* spp *pneumoniae* DSM3010 4T HAM. The isolate was found to degrade 60% prednisolone on the 5th day of fermentation. The concentration of prednisolone was determined using a colorimetric-based method and HPLC technique.

Keywords: *Klebsiella*, pollutant, prednisolone, transformation

Introduction

Pharmaceutical micropollutants concentration and persistence are increasing day by day due to the emergence of new diseases and the overuse of pharma products. During the covid 19 pandemic situation, mucormycosis cases were controlled with the use of steroidal drugs as per the RECOVERY (Randomised Evaluation of COVID-19 Therapy) trial (Tandon & Pandey, 2021). Prednisolone is a corticosteroid drug abused for doping in sports. It is a synthetic glucocorticoid drug with anti-inflammatory properties (Furman, 2019). Prednisolone being a steroid is a carbon rich, highly reduced compound, hence can be the source of carbon for microorganisms. But steroids are difficult to completely mineralize to carbon dioxide (Chixing et al., 2020). Biotransformations of steroidal drugs occur by hydroxylation, esterification, dehydrogenation/reduction, methoxylation, halogenations, and methylation (Tong & Dong, 2009).

Actinomycetes, proteobacteria, fungi, and algae have been reported to have the ability to biotransform steroid-based compounds. Microorganisms could biotransform steroidal compounds by hydroxylation reaction /Bayer-Villiger oxidation reaction or enzyme assisted mechanism. A reported list of steroid biotransforming microorganisms with the possible mechanism is given in table 1.

Table 1 Steroidal drugs and their microbial transformed metabolite.

Steroidal compound	Name of microorganism	Transformation mechanism	Biotransformed product	Reference
Diosgenin 3β-hydroxy-5-spirostene	*Streptomyces virginiae* IBL-14	Hydroxylation and Cytochrome p450 monooxygenase FcpC	Isomatigenone	Wang et al. (2007)
	White rot fungus, *Cariolus versicolor*	Hydroxylation reaction	Polyhydroxyl metabolite	Wu et al. (2011);
	Fungal strain *Absidia coerulea*	Hydroxylation reaction	Five metabolites: (25R)-spirost-5-en-3β,7β,12β,25α-tetrol, (25S)-spirost-5-en-3β,7α,12β,25β-tetrol, (25S)-spirost-5-en-3β,7β,12β,25β-tetrol, (25R)-spirost-5-en-3β,7α,12β,25α-tetrol and (25R)-spirost-5-en-3β,7β,12β,24β-tetrol	Zhao et al. (2010)

Author Name: Prof. Potdar P. R..

18. Title of Paper: Global Poverty Issues and Situation in India

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GLOBAL POVERTY ISSUES AND THE SITUATION IN INDIA

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ABSTRACT:

At present, the Indian economy is facing many challenges in the 21st century.In This ResearchPaper summaries the Current Situation of Poverty in India and overview of Present Poverty line, Causes of poverty and Health of Indian Economy in this COVID-19 Situation. Poverty can be defined as a phenomenon on which a section of the Society is unable to fulfil even its basic necessities of life. Around 8% of the world's population lives in extreme poverty. Around 8% of the world's population lives in extreme poverty. Living on less than $2 a day feels like an impossible scenario, but's a reality for around 600 million people in our world today. Approximately 8% of the global population lives in extreme poverty, commonly defined as surviving on only $1.90 a day, or less. India is the second largest populous country and one of the largest economies in the world. But only asmall percentage of the Indian population has benefited this impressive growth so far, as the majority of people in India are still living in abject poverty. Mostly people are staying unemployment. the lack of employment which provides a liveable wage in rural areas is driving many Indians into rapidly growing metro city's such as Mumbai, Delhi, Pune, Bangalore etc. this city's suffering problem such as Slum Area, drinking, water, electricity, garbage.

While poverty exists everywhere, it is most severe in developing countries, where more than one person in five lives on less than $1 a day.India with its population of 1.3 billion people now has 5% of its population living in extreme poverty, according to the World poverty Clock. Before we examine different efforts aimed at poverty alleviation, we should try to understand Global Poverty Issues and the Situation in India. This particular Research Paper presents on concept of Poverty, figures of Indian poverty, causes of poverty and Measures of poverty.

KEYWORD:

COVID-19, Poverty line, Absolute Poverty, Relative Poverty,Health, HDI, Uniform Recall Period, Mixed Recall Period, Rural Poverty, Urban Poverty.

INTRODUCTION:

The Covid-19 epidemic has caused a lot of problems in the world such as poverty, hunger, unemployment, migration and adversely affected the global economy.However, the economy still faces various problems and challenges, such as corruption, rising oil prices, Poor Infrastructure, Inequality within regions, Unemployment and poverty in rural areas and poor tax collection rates. The epidemic of Kovid-19 has hampered the poverty alleviation program. Poverty has an impact on economic growth and low economic growth has an impact on poverty. Now we are 74 years of Independence in India, today we are the fastest growing Economy of the world. But this growth is not shared throughout the society, the development will be failed. Poverty continues to remain a

Author Name: Dr. Sarange A. R.

19. Title of Paper: GST in India

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GST In India

Dr. Ananda Ramrao Sarange

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Abstract :-GST is the most crucial economic reform since the Liberalization, privatization and Globalization (LPG) reforms in the year 1991. In India GST is an Indirect Tax which has replaced many indirect Taxes that previously existed in India. France was the first country to implement GST in the year 1954. In India GST Journey began in the year 2000. When a committee was set up to draft GST Law by AtalBihariVajapayee government.It took 17 years from then for the Law to evolve in 2017 his GST bill was passed in the LokSabha and RajyaSabha and GST comes into force from 1 July 2017. GST is a path breaking indirect Tax reform which will create a common National market by dismantling Domestic State Trade harriers. The main objectives of GST are "One Nation, One Tax and One market".

Keyword :-Indirect Tax, Goods any Service Tax, Market, Rate of GST, Benefits and Need of GST, Impact of GST on the Indian Economy.

Introductions :-Nowadays GST is the buzz word of today's generation, Goods and Service Tax is the India's biggest tax reform since independence. GST is one indirect Tax for the whole India, which will make India one unified common market. GST make our products competitive in the domestic and International market.

The KelkarTast Force on the implementation of Fiscal Responsibility and Budget management Act; 2003, has pointed out that the existing system of Taxation on Goods & services suffers from many problems and therefore suggested is comprehensive Goods and Service Tax. The main reason behind introducing GST is to improve the economy of the nation.

Definition of GST :-The concept of goods and service tax popularly known as GST It is a dual structure, which means it will have two components - the central GST and state GST and it is simplify tax administration ensure ease of doing business and promote "Make in India".

0. Objectives of the Study :-

The Following are the objective of the study,

1) To study the concept of Goods and Service Tax (GST)
2) To highlight the impact of GST on Indian Economy.

0. Research Methodology :-

This paper is prepared through done with help of the information from secondary data from various websites, Journals, Research articles, newspapers and magazines and reference books related to Goods and Service Tax.

0. Components of GST :-

There one three taxes applicable under GST - CGST, SGST & IGST.

1) **CGST :** Collected by the Central Government on an Intra state Sale (E.g. : within Maharashtra).
2) **SGST :** Collected by the State Government on an intra - state Sale (E.g. within Maharashtra)
3) **IGST :** Collected by the Central Government for inter - State Sale (E.g. Maharashtra to Karnataka).

0. Impact of GST on Indian Economy :-

There one two type of impact on Indian Economy. (1) Positive Impact of GST (2) Negative Impact of GST.

0. Positive Impact of GST :-

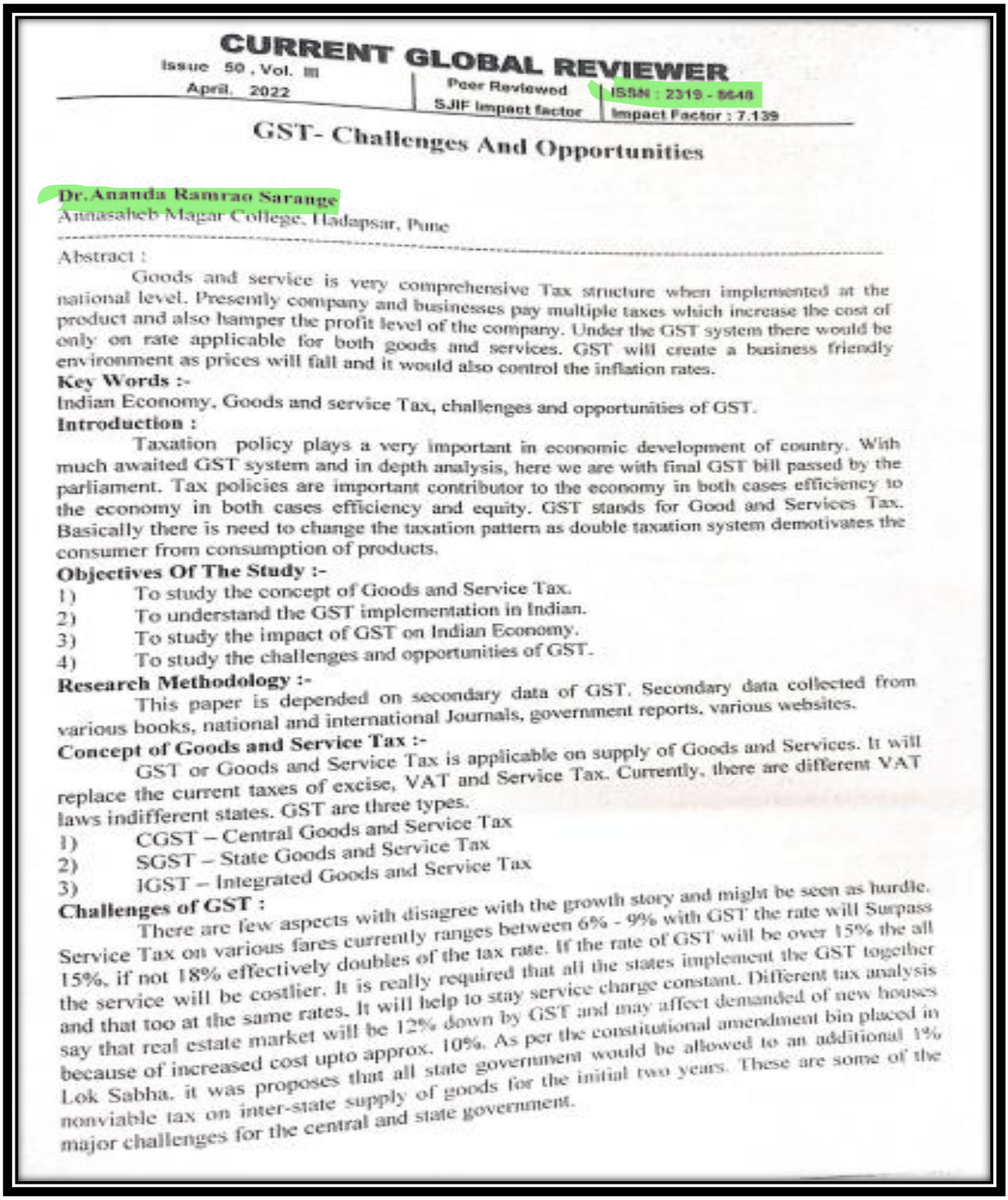
1) **Reduce the number of Indirect Taxes :-**
GST is a single taxation system that will reduce the number of indirect taxes. from now a single taxation term would cover all the those indirect taxes.

2) **Uniform Prices Throughout the India :-**
The prices of produces and services would reduce thus this system would prove to be beneficial for the people who are fed up of paying high prices and uniform prices throughout the India.

3) **Corruption free tax system :-**
Nowadays corruption is bad habit to economy. So New Tax system is Goods & service tax would intro-

Author Name: Dr. Sarange A. R.

20. Title of Paper: GST Challenges and Opportunities



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GST- Challenges And Opportunities

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Annasaheb Magar College, Hadapsar, Pune

Abstract :

Goods and service is very comprehensive Tax structure when implemented at the national level. Presently company and businesses pay multiple taxes which increase the cost of product and also hamper the profit level of the company. Under the GST system there would be only on rate applicable for both goods and services. GST will create a business friendly environment as prices will fall and it would also control the inflation rates.

Key Words :-
Indian Economy, Goods and service Tax, challenges and opportunities of GST.

Introduction :

Taxation policy plays a very important in economic development of country. With much awaited GST system and in depth analysis, here we are with final GST bill passed by the parliament. Tax policies are important contributor to the economy in both cases efficiency to the economy in both cases efficiency and equity. GST stands for Good and Services Tax. Basically there is need to change the taxation pattern as double taxation system demotivates the consumer from consumption of products.

Objectives Of The Study :-

1) To study the concept of Goods and Service Tax.
2) To understand the GST implementation in Indian.
3) To study the impact of GST on Indian Economy.
4) To study the challenges and opportunities of GST.

Research Methodology :-

This paper is depended on secondary data of GST. Secondary data collected from various books, national and international Journals, government reports, various websites.

Concept of Goods and Service Tax :-

GST or Goods and Service Tax is applicable on supply of Goods and Services. It will replace the current taxes of excise, VAT and Service Tax. Currently, there are different VAT laws indifferent states. GST are three types.

1) CGST – Central Goods and Service Tax
2) SGST – State Goods and Service Tax
3) IGST – Integrated Goods and Service Tax

Challenges of GST :

There are few aspects with disagree with the growth story and might be seen as hurdle. Service Tax on various fares currently ranges between 6% - 9% with GST the rate will Surpass 15%, if not 18% effectively doubles of the tax rate. If the rate of GST will be over 15% the all the service will be costlier. It is really required that all the states implement the GST together and that too at the same rates. It will help to stay service charge constant. Different tax analysis say that real estate market will be 12% down by GST and may affect demanded of new houses because of increased cost upto approx. 10%. As per the constitutional amendment bin placed in Lok Sabha. it was proposes that all state government would be allowed to an additional 1% nonviable tax on inter-state supply of goods for the initial two years. These are some of the major challenges for the central and state government.

Author Name: Dr. Bhosale M. M.

21. Title of Paper: Global Poverty Issues and Situation In India

Worldwide International Inter Disciplinary Research Journal (A Peer Reviewed Referred) ISSN – 2454 - 7905

GLOBAL POVERTY ISSUES AND THE SITUATION IN INDIA

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While poverty exists everywhere, it is most severe in developing countries, where more than one person in five lives on less than $1 a day.India with its population of 1.3 billion people now has 5% of its population living in extreme poverty, according to the World poverty Clock. Before we examine different efforts aimed at poverty alleviation, we should try to understand Global Poverty Issues and the Situation in India. This particular Research Paper presents on concept of Poverty, figures of Indian poverty, causes of poverty and Measures of poverty.

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Author Name: Dr. Kulkarni S. S

22. Title of Paper: Spatial Assessment of Soil Erosion using GIS Based Universal Soil Loss Equation Model for Zuari Basin River, Goa India

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SPATIAL ASSESSMENT OF SOIL EROSION USING GIS-BASED UNIVERSAL SOIL LOSS EQUATION MODEL FOR ZUARI RIVER BASIN, GOA, INDIA

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ABSTRACT

Soil erosion is considered as one of the serious worldwide environmental problems due to its economic implications. Assessment of soil erosion in the watershed is cumbersome due to its uneven pattern and quantifying the soil loss is imperative for conservation, planning, and management of natural resources. There are several models to estimate the soil loss. They are employed based on costs, areal extent, data availability, time, and required accuracy. In the present study, the USLE model is used to estimate the total soil loss in the Zuari River basin with the help of geospatial tools as the region is subjected to soil erosion. Thematic layers of R-factor, K-factor, LS factor, C factor, and P factors are generated and multiplied in a raster calculator to estimate the total soil loss in the basin. The soil loss in the region varies from 0.63 to 23.05 t/ha-1/yr-1.The region is categorized as low, moderate, severe, and extreme soil erosion areas based on the amount of soil loss. Zuari watershed is also divided into ten sub-watersheds to estimate the soil loss in each sub-basins for better assessment of soil erosion. Results illustrate that the soil erosion in SW6 and SW7 is higher. These basins are in the eastern part of the study area that forms the Western Ghats with rugged and dissected, highly elevated topography, whereas the region close to the mouth of the river with low altitude constitute SW1 and SW10 experience lesser amount of soil erosion. These results will assist decision-makers to frame the appropriate policies to conserve soil resources.

Keywords: Zuari River Watershed, USLE Model, Remote sensing and GIS, Soil erosion

Author Name: Dr. Narangalakar R

23. Title of Paper: Mahatma Gandhichi Gram Swarajgachi Sankalpana V Dalit

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७. महात्मा गांधींची ग्रामस्वराज्याची संकल्पना आणि दलित

राहुल नरंगलकर
सा. प्राध्यापक, राज्यशास्त्र अण्णासाहेब मगर महाविद्यालय, हडपसर, पुणे.

गावातील सार्वजनिक जीवन व्यवहार हा संपूर्णत: किंवा बव्हंशी त्या गावातील रहिवाशांच्या संमतीने, सहकार्याने आणि सल्ल्यानुसार चालत असल्यास, तेथे ग्रामराज्य अस्तित्वात आहे असे समजले जाते. महात्मा गांधींनी ग्रामोद्धाराकरिता ज्या विविध विधायक योजना देशापुढे मांडल्या, त्यांपैकी ग्रामस्वराज्याची योजना ही मूलभूत आणि सर्वस्पर्शी अशी आहे. प्रत्येक गावातील रहिवाशांनी बाह्य प्रलोभनाला बळी न पडता स्वत:चे गाव आर्थिक दृष्ट्या स्वयंपूर्ण बनविणे, तेथील शासकीय कारभार संपूर्णत: स्वत:च्या हातात ठेवणे आणि शिक्षण, आरोग्य आणि सांस्कृतिक गरजा, त्यांची व्यावहारिक उपयुक्तता लक्षात घेऊन स्वप्रयत्नाने भागविणे, ही ग्रामस्वराज्याची प्रमुख उद्दिष्टे आहेत.

ग्रामराज्य हे एका व्यक्तीच्या किंवा अल्पसंख्य अथवा बहुसंख्य गटाच्या हितसंबंधाचे रक्षणकर्ते न होता सर्वांचे हिताचे रक्षणकर्ते बनावे, असे सांगून महात्मा गांधींचे अनुनयायी व भूदान चळवळीचे प्रणेते विनोबा भावे यांनी 'सामर्थ्यवानांच्या सामर्थ्याचा वापर जनतेच्या सेवेकरिता केले जावे, जनता पूर्णपणे स्वावलंबी व परस्पर सहकार्य करणारी असावी, नित्याचे सहकार्य वा प्रासंगिक असहकार अहिंसात्मकच असावा आणि समान परिश्रमाचा मोबदला समान असावा.' असे ग्रामस्वराज्याचे चार आधारस्तंभ सांगितले आहेत. 'बुद्धीने, शारीरिक बळ, आणि साधनसंपत्ती याबाबतीत सामर्थ्यवान असणाऱ्यांनी दुर्बलांचे रक्षण करावे.' या गांधीजींच्या विश्वस्त संकल्पनेचा आविष्कार ग्रामराज्याचा पाया व्हावा. स्वावलंबन हे ग्रामोद्योगांच्या विकासामुळे, जनतेतील ऐक्य हे अहिंसा आणि सहकार्य यांमुळे तर समता ही समान मोबदल्यामुळे प्रस्थापित होते, अशी यामागील श्रद्धा आहे.

अशा या महात्मा गांधींच्या आदर्शवादी ग्रामस्वराज्याच्या अथवा ग्रामविकासाच्या संकल्पनेवर डावे पुरोगामी आणि पूर्वास्पृश्यातील कार्यकर्ते आणि विचारवंत यांचा तिव्र आक्षेप असतो. कारण भारतीय गावगाड्याच्या सामाजिक, आर्थिक, राजकीय आणि सांस्कृतिक संरचनेचा पाया विषमता, भेदभाव, स्तरीकरण आणि उच्च-निचता (श्रेष्ठ-कनिष्ठत्व) याने परिदृढ बनलेला आहे. शोषणात्याचार, दारिद्रय, अंधश्रद्धा आणि दडपणूक ही वैगुण्य धारण केलेल्या ग्रामव्यवस्थेचा श्रेणीबध्द जाती संरचना हा कणा आहे. ग्रामाच्या श्रेणीबध्द जाती संरचनेत प्रत्येक जातींच्या परंपरेने निश्चित व दृढ असलेल्या स्थानामध्ये आजही फारसा फरक पडलेला नाही. खेडयांच्या सामाजिक, आर्थिक, राजकीय आणि सांस्कृतिक संरचनेत झालेले बदलही फारसे समाधानकारक नाहीत. पूर्वास्पृश्य जातीतील एखादया व्यक्ती अथवा गटाने आपल्या पारंपारिक स्थानात परिश्रमपूर्वक बदल घडवून आणण्याचे प्रयत्न केल्यास त्या व्यक्ती अथवा गटाला संवर्णांच्या जबर शिक्षेला किंवा छळवणूकीला सामोरे जावे लागते. आज खेडयांच्या सामाजिक, आर्थिक, राजकीय आणि सांस्कृतिक संरचनेत काही प्रमाणात स्थित्यंतर आलेली आहे, पण तिची पक्कड मात्र नष्ट होऊ शकली नाही.

स्वावलंबी किंवा स्वंयपूर्ण खेडयांची म्हणजेच ग्रामस्वराज्याची अर्थातच महात्मा गांधींच्या परिभाषेत 'रामराज्याची' उभारणी करण्यासाठी खेडयांच्या पारंपारिक संरचनेत बदल करणे अनिवार्य ठरते; परंतु तसे बदल करण्यासाठी कोणती रणनीती वापरावी ? कोणता कार्यक्रम हाती घ्यावा ? या उलघडा होणे गांधींच्या 'ग्रामस्वराज्याच्या' परिणामकारक अंमलबजावणीसाठी आवश्यक ठरते. भारतीय संविधानाच्या चौथ्या भागात 'राज्यधोरणाची मार्गदर्शक तत्वे' या शीर्षकांतर्गत कलम ३८ मध्ये "(१) राज्य, त्यास शक्य होईल तितक्या परिणामकारकरीतीने सामाजिक, आर्थिक, राजकीय न्यायाद्वारे राष्ट्रीय जीवनाच्या सर्व घटकांमध्ये प्रेरणा निर्माण करील अशी समाजव्यवस्था प्रस्थापित करून व तिचे जतन करून लोककल्याणाचे संवर्धन करण्यासाठी प्रयत्नशील राहील,"

Author Name: Prof. Dr. Ranadive K. R.

24. Title of Paper: Antimethicillin resistance of fruiting body & mycelial culture extracts of Xylarialongipes NITSCHKE Ascomycetes

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ANTI-METHICILLIN-RESISTANT *S. aureus* ACTIVITY OF FRUITING BODY AND MYCELIAL CULTURE EXTRACTS OF *Xylaria longipes* NITSCHKE (ASCOMYCOTA)

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Resistance to penicillin by *Staphylococcus aureus* gave rise to methicillin-resistant *S. aureus* (MRSA) and the emergence of vancomycin-resistant *S. aureus* (VRSA) that was reported later. Finding an alternative antimicrobial in the treatment of Staphylococcal infections is the need of the hour. In this context, secondary metabolites of both the fruiting body and mycelia of wood-rotting fungi *Xylaria longipes* were evaluated for anti-MRSA activity. Thin layer chromatographic (TLC) separation and bioautography of the acetone extract revealed a strong anti-MRSA activity at $R_f = 0.69 \pm 0.28$. The bioactive anti-MRSA compound was partially characterized by Fourier transform infrared (FTIR) spectroscopy and liquid chromatography—tandem mass spectrometry (LC-MS/MS). The analysis suggested anti-MRSA activity could be due to integric acid, eremoxylarin C, or a related compound.

Keywords: antimicrobials; drug resistance; *Staphylococcus aureus;* wood-rotting fungi; *Xylaria longipes.*

1. INTRODUCTION

Staphylococcus aureus is an important human pathogen and the most common cause of nosocomial infections among human beings. Penicillin was an effective antibiotic in the treatment of *S. aureus* infections, however, most of *S. aureus* strains have developed resistance to penicillin. To counter this problem, methicillin was introduced but, after several years of its usage, methicillin-resistant *S. aureus* (MRSA) strains emerged. Currently, MRSA is resistant to most of the penicillin-like antibiotics called beta-lactams, which include amoxicillin, oxacillin, dicloxacillin, carbapenems, and others. Vancomycin, a glycopeptide antibiotic was the only effective alternative available in the management of multi-drug resistant MRSA [1]. However, the emergence of vancomycin-resistant *S. aureus* (VRSA) was reported later [2]. The resistance of *S. aureus* to various antibiotics and the increase in life-threatening infections caused by *S. aureus* in hospitalized and non-hospitalized patients is a great health care concern among the physicians and public health authorities. This necessitates the search for an alternative, potent antibiotic in the management of infections caused by *S. aureus.*

Macromycetes (macrofungi/mushrooms) are the groups of fungi with macroscopic 'fruiting bodies' belonging to the division Basidiomycetes and a few Ascomycetes. Macromycetes also include the lignicolous or wood-rotting (White-Rot) fungi which decompose the wood using both enzymatic and non-enzymatic reactions [3]. Macrofungi contain a variety of pharmacologically active compounds with antimicrobial, antiparasitic, antioxidative, antidiabetic, antineoplastic, antiulcer and hepatoprotective activities. The antimicrobial activities of these fungi against both Gram-positive and Gram-negative bacteria are well reported in the literature [4, 5]. In spite of their potential medicinal properties [6, 7], only 10% of mushrooms were described and even less have been tested for therapeutic values [8, 9].

Xylariaceae is a family of ascomycetes fungi that cause pseudo white rot/soft-rot type II of the wood [10]. Apart

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25. Title of Paper: Some Novel Properties of Cassia fistula- A Review

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Some Novel Properties of *Cassia Fistula* Linn.-A Review

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ABSTRACT

Cassia fistula Linn.Belongs to family Leguminosae, Sub – family Caesalpineae, a very common Indian plant is known for its medicinal properties. *C. fistula* is known to be an important source of secondary metabolites notably phenolic compounds like tannins, flavonoids and glycosides. Pharmacological activities include antibacterial, antidiabetic, antifertility, anti-inflammatory antioxidant, hypatoprotective, antitumor, antifungal activities. This article provides glimpses on morphology, traditional uses and its phytochemical and pharmacological activities.

Introduction

Cassia fistula Linn. from family Leguminosae, a common Indian plant is known for its medicinal properties. It is a native of Tropical Asia. It is widely cultivated in South Africa, Mexico, East Africa and Brazil. This plant is used in folk medicine for tumors of the abdomen, glands, liver, curing burns, constipation, convulsions, diarrhea, dysuria, epilepsy, throat cancer, leprosy, skin dieseases and syphilis. Ayurvedic medicines recognizes as carminative and laxative. Phytochemical investigations prove its importance as an important valuable medicinal plant. *C. fistula* is known to be an important source of secondary metabolites notably phenolic compounds like tannins, flavonoids and glycosides. Pharmacological activities include antibacterial, antidiabetic, antifertility, anti-inflammatory antioxidant, hypatoprotective, antitumor, antifungal activities. This article provides glimpses on morphology, traditional uses and its phytochemical and pharmacological activities.

C. fistula L. Sp. Pl. 377.1753; Baker in Hook.f. Fl. Brit. India 2: 261. 1878; Cooke, Fl. Pres. Bombay 1:444. 1958 (Repr.); Pandey in J. Bombay nat. Hist. Soc. 68: 313. 1971; Sanj. Leg. India 15. 1991. *'Amaltas', 'Bava', 'Garma'*. Trees, c 10 m tall. Leaflets 4–8 pairs, 5.0–12.5 x 2.5–6.0 cm, ovate. Flowers yellow, in 24–40 cm long, lax, drooping racemes. Pods 2.0–2.5 cm across, indehiscent.Seeds numerous, embedded in dark coloured pulp. *Fls. &Frts.*: April–October. *Illus.*: Wight, Ic. t. 269. 1840 *(C. rhombifolia);*Matthew, Fur. Illus. Fl. Tamilnadu Carnatic 2: tt. 224, ff. 1–15 & 225, ff. 1–2. 1988.*Distrib.*: Common throughout the state in deciduous forests. Also planted in home gardens. Its belongs to Fabaceae, Caesalpinioideae, a very common plant known for its medicinal properties is a semi-wild in nature. It is distributed in various regions including Asia, South Africa, China, West Indies and Brazil 1. It is commonly known as Amultas and in English popularly called "Indian Laburnum" has been extensively used in Ayurvedic system of medicine forests throughout greater parts of India, ascending to 1300 m in outer Himalaya, is widely used in traditional medicinal system of India.

Geographical distribution:

In deciduous and mixed monsoon forests throughout greater parts of India, ascending to 1300 m in outer Himalaya. In Maharashtra, it occurs as a scattered tree throughout the Deccan and Konkan. The plant is cultivated as an ornamental throughout India.

Taxonomic Position

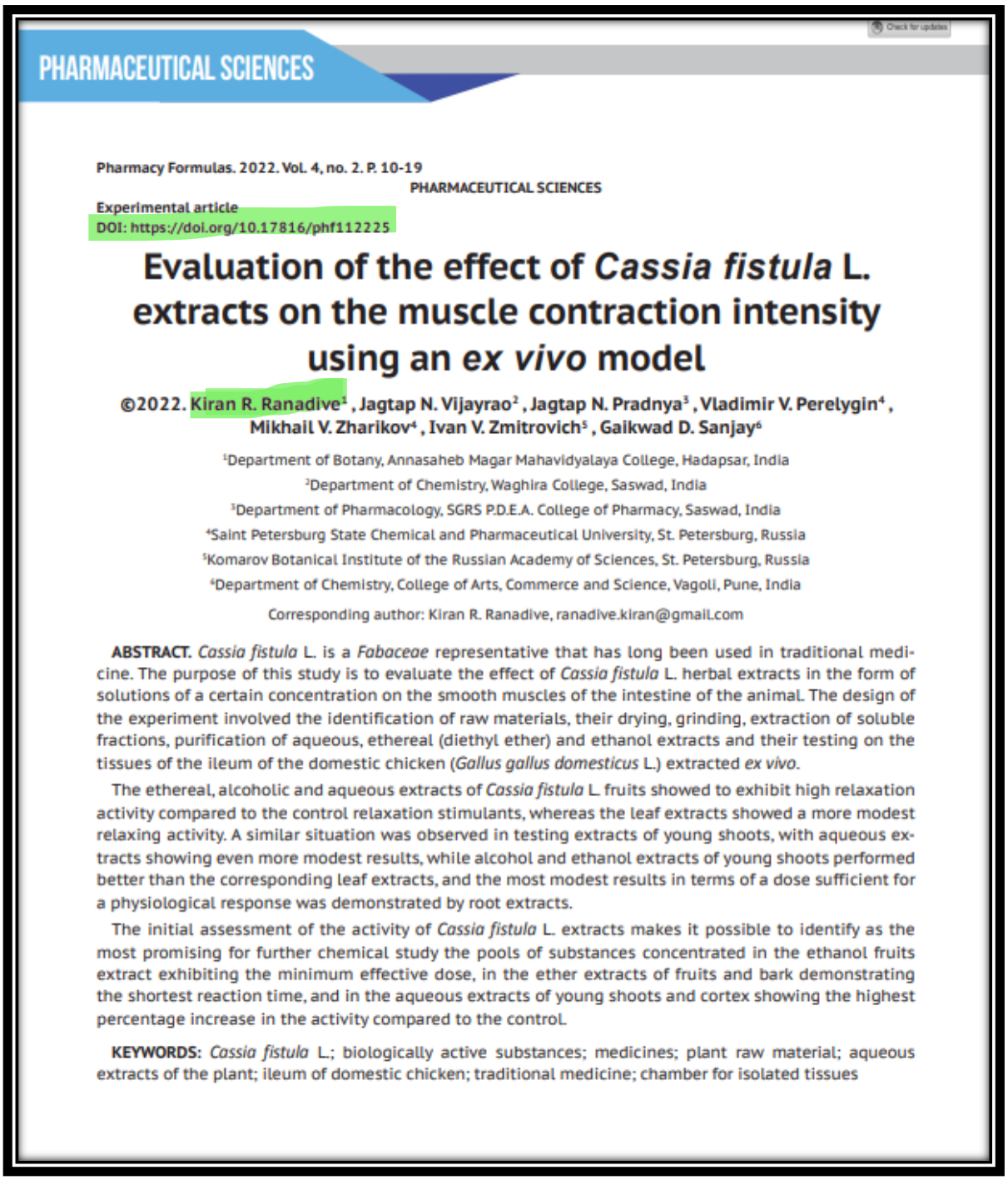
Kingdom	: Plantae
Subkingdom	: Tracheobinota
Super Division	: Spermatophyta
Division	: Mangoliophyta
Class	: Magnoliopsida
Sub Class	: Rosidae
Order	: Fabales
Family	: Fabacae
Genus	: *Cassia*
Species	: *fistula*

Morphology

It is a deciduous tree with greenish grey bark, compound leaves, leaf lets are each 5-12 cm long pairs. A semi-wild tree known for its beautiful bunches of yellow flowers and also used in traditional medicine for several indications. A fruit is cylindrical pod and seeds many in black, sweet pulp separated by transverse partitions. The long pods which are green, when unripe, turn black on ripening after flowers shed. Pulp is dark brown in color, sticky, sweet and mucilaginous, odour characteristic, and somewhat disagreeable. Drug occurs in flator curved thick pieces; outer surface smooth to rough with warty patches; greenish grey to red; inner surface rough, reddish with parallel striations; fracture, laminate; odour, sweet and characteristic; taste, astringent.

Author Name: Prof. Dr. Ranadive K. R.

26. Title of Paper: Evaluation of the Effect of *Cassia fistula* L. Extracts on the Muscle Contraction Intensity Using an ex Vivo Model



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Evaluation of the effect of *Cassia fistula* L. extracts on the muscle contraction intensity using an *ex vivo* model

©2022. Kiran R. Ranadive[1], Jagtap N. Vijayrao[2], Jagtap N. Pradnya[3], Vladimir V. Perelygin[4], Mikhail V. Zharikov[4], Ivan V. Zmitrovich[5], Gaikwad D. Sanjay[6]

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ABSTRACT. *Cassia fistula* L. is a *Fabaceae* representative that has long been used in traditional medicine. The purpose of this study is to evaluate the effect of *Cassia fistula* L. herbal extracts in the form of solutions of a certain concentration on the smooth muscles of the intestine of the animal. The design of the experiment involved the identification of raw materials, their drying, grinding, extraction of soluble fractions, purification of aqueous, ethereal (diethyl ether) and ethanol extracts and their testing on the tissues of the ileum of the domestic chicken (*Gallus gallus domesticus* L.) extracted *ex vivo*.

The ethereal, alcoholic and aqueous extracts of *Cassia fistula* L. fruits showed to exhibit high relaxation activity compared to the control relaxation stimulants, whereas the leaf extracts showed a more modest relaxing activity. A similar situation was observed in testing extracts of young shoots, with aqueous extracts showing even more modest results, while alcohol and ethanol extracts of young shoots performed better than the corresponding leaf extracts, and the most modest results in terms of a dose sufficient for a physiological response was demonstrated by root extracts.

The initial assessment of the activity of *Cassia fistula* L. extracts makes it possible to identify as the most promising for further chemical study the pools of substances concentrated in the ethanol fruits extract exhibiting the minimum effective dose, in the ether extracts of fruits and bark demonstrating the shortest reaction time, and in the aqueous extracts of young shoots and cortex showing the highest percentage increase in the activity compared to the control.

KEYWORDS: *Cassia fistula* L.; biologically active substances; medicines; plant raw material; aqueous extracts of the plant; ileum of domestic chicken; traditional medicine; chamber for isolated tissues

Author Name: Prof. Waghmode M. S.

27. Title: Microbial Cell Factories Management of Pharmaceutical Micropollutant

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Review

Microbial Cell Factories for the Management of Pharmaceutical Micropollutants

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ABSTRACT
Extensive use of pharmaceutical drugs and its disposal in soil and water reservoirs leads to serious environmental pollution. These pharmaceutical micropollutants are highly water soluble, low biodegradable and easily accumulated in the food chain. Thus, these micropollutants persist in the environment and may cause a serious threat to ecosystem. This review highlights the sources of pharmaceutical micropollutants and adverse effects on ecosystem. The pharmaceutical drugs such as anti-convulsive drugs, antidepressants and cytostatic drugs are more ecotoxic, hence need to remove them from contaminated environments. Further, review also insights the importance of microbial degradation in management of pharmaceutical pollutions.

Key words: Bioremediation, ecotoxicity, micro pollutants, bioaccumulation, Covid-19

INTRODUCTION

Increasing multidrug resistance in microorganisms and development of several diseases which leads to increasing drug usage. During COVID-19 situation, several antiviral drugs, steroids and painkillers are used which results into discharge of drugs in the environment (Nippes et al. 2021, Gwenzi et al. 2022). Environmentally acquired drug resistance in human pathogens has been observed. For example, Oseltamevir and Tamiflu developed Influenza A virus resistance in wild fowl reported previously (Fick et al. 2007, Singer et al. 2007, Kuroda et al. 2021). Domestic, industrial and hospital activities are responsible for discharge of several pharma micropollutants in the aquatic environment (Ribeiro et al. 2015). The existence of active ingredients of pharmaceuticals and personal care products (PCPs) in the environment are also detected (Brausch and Rand 2011, Montesdeoca et al. 2018). It is investigated that both steroidal and non-steroidal drugs are detected in water and soil environment (Ghlichloo and Gerriets 2021).

The drugs such as diclofenac, azithromycin, clarithromycin and erythromycin are considered as emerging contaminants in the environment (Ribeiro et al. 2015). The diclofenac has been detected in drinking water in range of 0.02 ng/L to 20.00 µg/L (Simazaki et al. 2015). It was also studied that diclofenac and its metabolites such as 42 -hydroxy-DCF and 5-hydroxy-DCF are found in wastewater (Bouju et al. 2016). Other contaminants mixture of non-steroidal anti-inflammatory drugs like diclofenac, ibuprofen, naproxen, and acetylsalicylic acid are considered as serious threat to the environment and human health (Cleuvers 2004). Therefore, management of such harmful contaminants is of prime importance. The techniques such as nanofiltration and reverse osmosis are suggested by several researchers for the treatment of contaminated water bodies (Radjenovic et al. 2008). Some conventional methods such as sewer, combustion, or land disposal are used for disposal of pharma products (Ivshina et al. 2006).

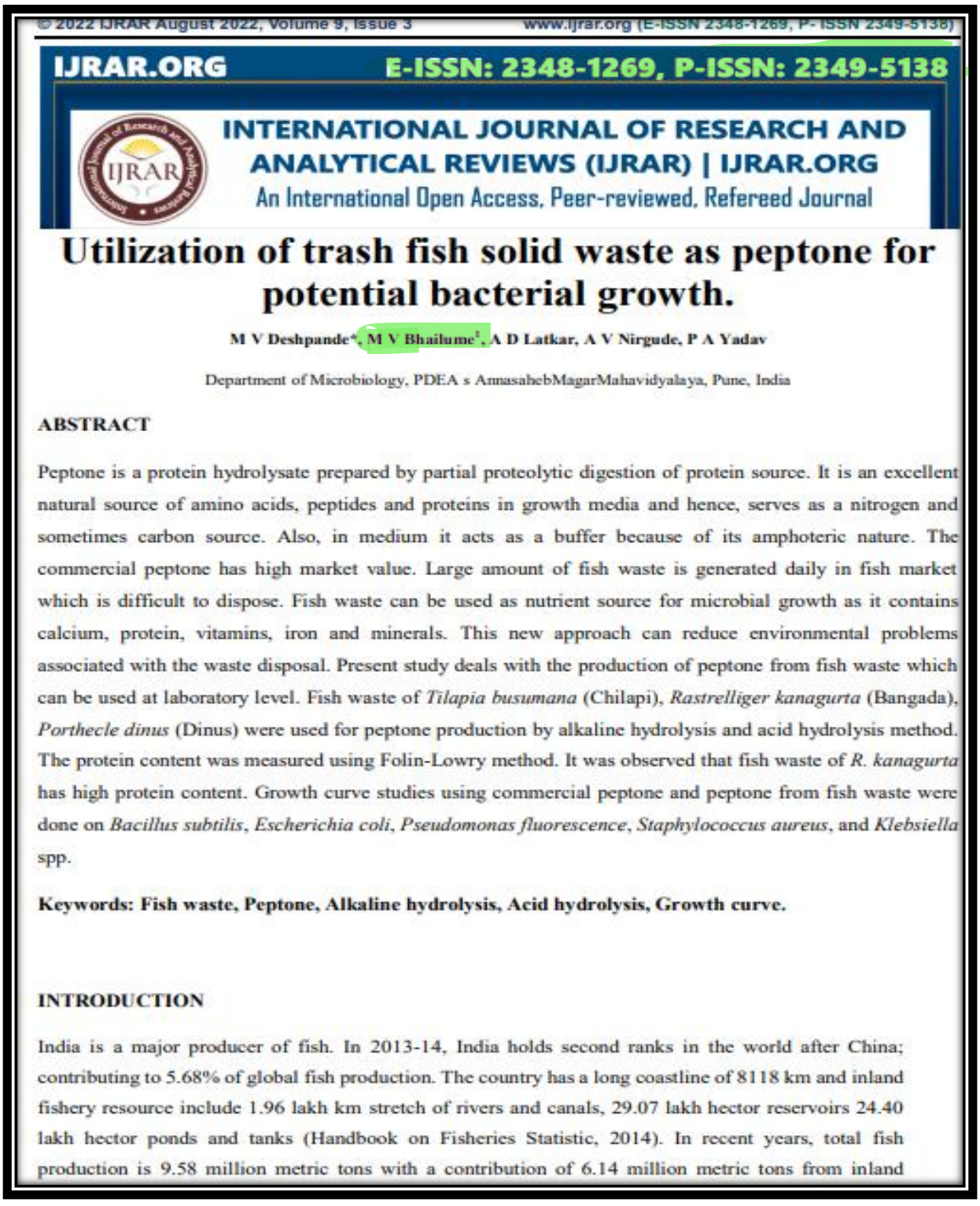
Recently, other processes like advanced oxidation and solar photodegradation are recommended for removal of diclofenac from surface water (Leónidas et al. 2005). Implementation of physicochemical methods for the removal of cytostatic compounds (ecotoxic) at the site of origin and utilization is difficult as compared to biological method (Bhattacharyya et al. 2022).

Impact of Pharmaceutical Micropollutants on Ecosystem

Pharmaceutical products are the primary concern in aquatic environment (Patel et al. 2019). They have (Abdalla and Hammam 2014). The Pilot study has been carried out for the applicability of disinfection process for the more than 50% removal of residual concentration of anti-inflammatory and anti-

Author Name: Prof. Bhailume M. V.

28. Title of Paper: Utilization of Trash Fish Solid Waste as Peptone for Potential Bacterial Growth



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Utilization of trash fish solid waste as peptone for potential bacterial growth.

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ABSTRACT

Peptone is a protein hydrolysate prepared by partial proteolytic digestion of protein source. It is an excellent natural source of amino acids, peptides and proteins in growth media and hence, serves as a nitrogen and sometimes carbon source. Also, in medium it acts as a buffer because of its amphoteric nature. The commercial peptone has high market value. Large amount of fish waste is generated daily in fish market which is difficult to dispose. Fish waste can be used as nutrient source for microbial growth as it contains calcium, protein, vitamins, iron and minerals. This new approach can reduce environmental problems associated with the waste disposal. Present study deals with the production of peptone from fish waste which can be used at laboratory level. Fish waste of *Tilapia busumana* (Chilapi), *Rastrelliger kanagurta* (Bangada), *Porthecle dinus* (Dinus) were used for peptone production by alkaline hydrolysis and acid hydrolysis method. The protein content was measured using Folin-Lowry method. It was observed that fish waste of *R. kanagurta* has high protein content. Growth curve studies using commercial peptone and peptone from fish waste were done on *Bacillus subtilis*, *Escherichia coli*, *Pseudomonas fluorescence*, *Staphylococcus aureus*, and *Klebsiella* spp.

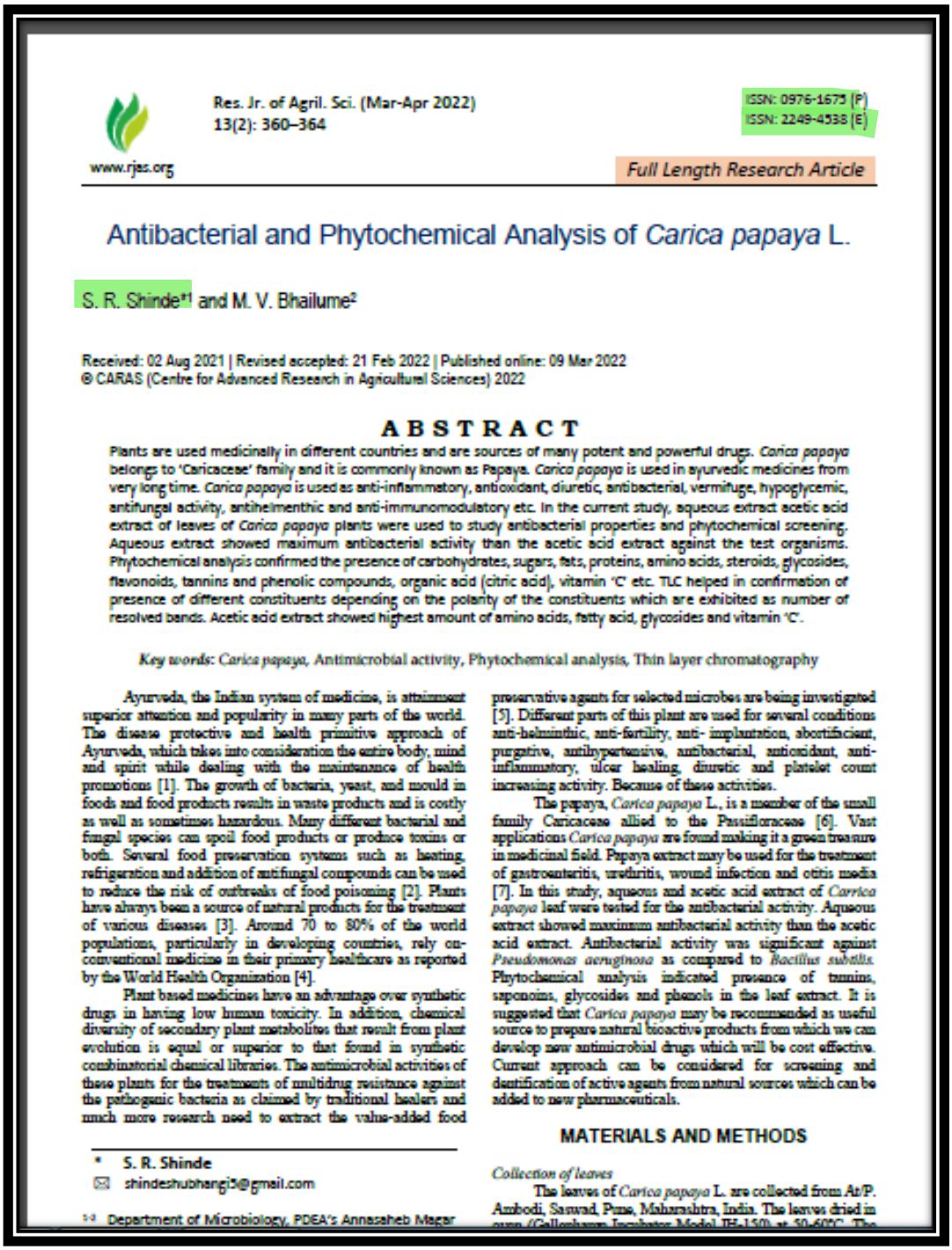
Keywords: Fish waste, Peptone, Alkaline hydrolysis, Acid hydrolysis, Growth curve.

INTRODUCTION

India is a major producer of fish. In 2013-14, India holds second ranks in the world after China; contributing to 5.68% of global fish production. The country has a long coastline of 8118 km and inland fishery resource include 1.96 lakh km stretch of rivers and canals, 29.07 lakh hector reservoirs 24.40 lakh hector ponds and tanks (Handbook on Fisheries Statistic, 2014). In recent years, total fish production is 9.58 million metric tons with a contribution of 6.14 million metric tons from inland

Author Name: Dr. Shinde S. R.

29. Title of Paper: Antibacterial and Phytochemical Analysis of Carica papaya L.



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Full Length Research Article

Antibacterial and Phytochemical Analysis of *Carica papaya* L.

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ABSTRACT

Plants are used medicinally in different countries and are sources of many potent and powerful drugs. *Carica papaya* belongs to 'Caricaceae' family and it is commonly known as Papaya. *Carica papaya* is used in ayurvedic medicines from very long time. *Carica papaya* is used as anti-inflammatory, antioxidant, diuretic, antibacterial, vermifuge, hypoglycemic, antifungal activity, antihelmenthic and anti-immunomodulatory etc. In the current study, aqueous extract acetic acid extract of leaves of *Carica papaya* plants were used to study antibacterial properties and phytochemical screening. Aqueous extract showed maximum antibacterial activity than the acetic acid extract against the test organisms. Phytochemical analysis confirmed the presence of carbohydrates, sugars, fats, proteins, amino acids, steroids, glycosides, flavonoids, tannins and phenolic compounds, organic acid (citric acid), vitamin 'C' etc. TLC helped in confirmation of presence of different constituents depending on the polarity of the constituents which are exhibited as number of resolved bands. Acetic acid extract showed highest amount of amino acids, fatty acid, glycosides and vitamin 'C'.

Key words: *Carica papaya*, Antimicrobial activity, Phytochemical analysis, Thin layer chromatography

Ayurveda, the Indian system of medicine, is attainment superior attention and popularity in many parts of the world. The disease protective and health primitive approach of Ayurveda, which takes into consideration the entire body, mind and spirit while dealing with the maintenance of health promotions [1]. The growth of bacteria, yeast, and mould in foods and food products results in waste products and is costly as well as sometimes hazardous. Many different bacterial and fungal species can spoil food products or produce toxins or both. Several food preservation systems such as heating, refrigeration and addition of antifungal compounds can be used to reduce the risk of outbreaks of food poisoning [2]. Plants have always been a source of natural products for the treatment of various diseases [3]. Around 70 to 80% of the world populations, particularly in developing countries, rely on-conventional medicine in their primary healthcare as reported by the World Health Organization [4].

Plant based medicines have an advantage over synthetic drugs in having low human toxicity. In addition, chemical diversity of secondary plant metabolites that result from plant evolution is equal or superior to that found in synthetic combinatorial chemical libraries. The antimicrobial activities of these plants for the treatments of multidrug resistance against the pathogenic bacteria as claimed by traditional healers and much more research need to extract the value-added food preservative agents for selected microbes are being investigated [5]. Different parts of this plant are used for several conditions anti-helminthic, anti-fertility, anti- implantation, abortifacient, purgative, antihypertensive, antibacterial, antioxidant, anti-inflammatory, ulcer healing, diuretic and platelet count increasing activity. Because of these activities.

The papaya, *Carica papaya* L., is a member of the small family Caricaceae allied to the Passifloraceae [6]. Vast applications *Carica papaya* are found making it a green treasure in medicinal field. Papaya extract may be used for the treatment of gastroenteritis, urethritis, wound infection and otitis media [7]. In this study, aqueous and acetic acid extract of *Carica papaya* leaf were tested for the antibacterial activity. Aqueous extract showed maximum antibacterial activity than the acetic acid extract. Antibacterial activity was significant against *Pseudomonas aeruginosa* as compared to *Bacillus subtilis*. Phytochemical analysis indicated presence of tannins, saponoins, glycosides and phenols in the leaf extract. It is suggested that *Carica papaya* may be recommended as useful source to prepare natural bioactive products from which we can develop new antimicrobial drugs which will be cost effective. Current approach can be considered for screening and identification of active agents from natural sources which can be added to new pharmaceuticals.

MATERIALS AND METHODS

Collection of leaves

The leaves of *Carica papaya* L. are collected from At/P. Ambodi, Saswad, Pune, Maharashtra, India. The leaves dried in oven (Gallenkamp Incubator Model IH-150) at 50-60°C. The

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30. Title of Paper: Primary studies on Biotransformation of Steroidal Drug Prednisolone

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Research Article

Primary studies on biotransformation of steroidal drug Prednisolone

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Abstract

The less biodegradable steroidal drug, Prednisolone is one of the widely used drugs in the treatment of autoimmune and infectious diseases. Transformation of prednisolone can be achieved with microbial activity. Isolation of prednisolone-resistant microorganisms was done using a sewage sample. Out of 5 isolates, one isolate was selected for further studies based on maximum tolerability to prednisolone. The isolate was identified based on MALDI-TOF. The strain was found to have a match score of 2.336 with gram-negative bacteria *Klebsiella pneumoniae* spp *pneumoniae* DSM3010 4T HAM. The isolate was found to degrade 60% prednisolone on the 5th day of fermentation. The concentration of prednisolone was determined using a colorimetric-based method and HPLC technique.

Keywords: *Klebsiella*, pollutant, prednisolone, transformation

Introduction

Pharmaceutical micropollutants concentration and persistence are increasing day by day due to the emergence of new diseases and the overuse of pharma products. During the covid 19 pandemic situation, mucormycosis cases were controlled with the use of steroidal drugs as per the RECOVERY (Randomised Evaluation of COVID-19 Therapy) trial (Tandon & Pandey, 2021). Prednisolone is a corticosteroid drug abused for doping in sports. It is a synthetic glucocorticoid drug with anti-inflammatory properties (Furman, 2019). Prednisolone being a steroid is a carbon rich, highly reduced compound, hence can be the source of carbon for microorganisms. But steroids are difficult to completely mineralize to carbon dioxide (Chixing et al., 2020). Biotransformations of steroidal drugs occur by hydroxylation, esterification, dehydrogenation/reduction, methoxylation, halogenations, and methylation (Tong & Dong, 2009).

Actinomycetes, proteobacteria, fungi, and algae have been reported to have the ability to biotransform steroid-based compounds. Microorganisms could biotransform steroidal compounds by hydroxylation reaction /Bayer-Villiger oxidation reaction or enzyme assisted mechanism. A reported list of steroid biotransforming microorganisms with the possible mechanism is given in table 1.

Table 1 Steroidal drugs and their microbial transformed metabolite.

Steroidal compound	Name of microorganism	Transformation mechanism	Biotransformed product	Reference
Diosgenin 3β-hydroxy-5-spirostene	*Streptomyces virginiae* IBL-14	Hydroxylation and Cytochrome p450 monooxygenase FcpC	Isonuatigenone	Wang et al. (2007)
	White rot fungus, *Cariolus versicolor*	Hydroxylation reaction	Polyhydroxyl metabolite	Wu et al. (2011);
	Fungal strain *Absidia coerulea*	Hydroxylation reaction	Five metabolites: (25R)-spirost-5-en-3β,7β,12β,25α-tetrol, (25S)-spirost-5-en-3β,7α,12β,25β-tetrol, (25S)-spirost-5-en-3β,7β,12β,25β-tetrol, (25R)-spirost-5-en-3β,7α,12β,25α-tetrol and (25R)-spirost-5-en-3β,7β,12β,24β-tetrol	Zhao et al. (2010)

Author Name: Prof. Dr. Patil N. N.

31 Title of Paper: A Survey on Microbial Pigments: Production and Applications.

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A Survey on Microbial Pigments: Production and Applications

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Abstract :*Pigments have become an essential part of our daily lives and have extensive applications in many areas such as food, cosmetics, agriculture, pharmaceuticals, textile. Since the 1980s synthetic pigments have been widely used in various applications. These synthetic pigments have adverse effects on environment and public health. The carcinogenicity or hyper allergenicity effects of synthetic dyes have led to increased research on natural pigments. Due to such drawbacks of synthetic pigments, the use of natural pigments are considered as the best alternative to synthetic pigments.Natural pigments from microorganisms are of great interest due to their significant properties and broader applications. The increasing demand among the consumers opting for natural pigments. To fulfill these market demand of natural pigments new sources should be explored. Among the natural resources, Microbial pigments represent an eco-friendly alternative as they can be produced in large amounts through biotechnological processes and do not present environmental risks, as they are easily decomposable. This review article highlights the various types of microbial pigments and the latest studies on the discovery of these pigments, the biosynthetic pathways and applications of these pigments which hopefully provides useful information, guidance and improvement in forthcoming studies.*

Keywords : Microbial pigment, Synthetic dye, Carotenoid, Violacein, Antimicrobial, Antioxidant

1.INTRODUCTION

Pigments are colorful secondary metabolites produced by microorganism. Since the prehistoric era pigments have been used as coloring agents. The first synthetic dye mauvine was prepared in 1856 by Sir William Henry Perkin. The historical revolution of synthetic dyes initiated by development of mauvine [1]. At first synthetic dyes get much attraction because of their different benefits like the development process for snthetic dyes is easy, they have good coloring properties, they required in very small amount for use. But most of the synthetic dyes that are used are never tested for their toxic effects[2]. Several studies show that synthetic dyes can cause adverse effects towards human health and have negative impact on environment. Some synthetic coloring agents which were originally approved by Food and Drug Administration (FDA) for use, were later found to cause cancer and hyperactive in children so they had been withdrawn from use due to their hazards impact on health [3]. The composition of synthetic dyes contain the chemical compounds like lead, copper, mercury, chromium, benzene, that have adverse effects on human being. The colorants that are obtained syntheticallyinclude ethyl acrylate, benzophenone, pyridin are banned by the FDA. In Washington the Center for Science in the Public Interest pleading to the FDA in 2008 to decline synthetic food colorants due to it's harmful effects among children [4]. The below (Table.1) shows some studies was done to investigate the ecological toxicity of some synthetic dyes to different orgnisms.

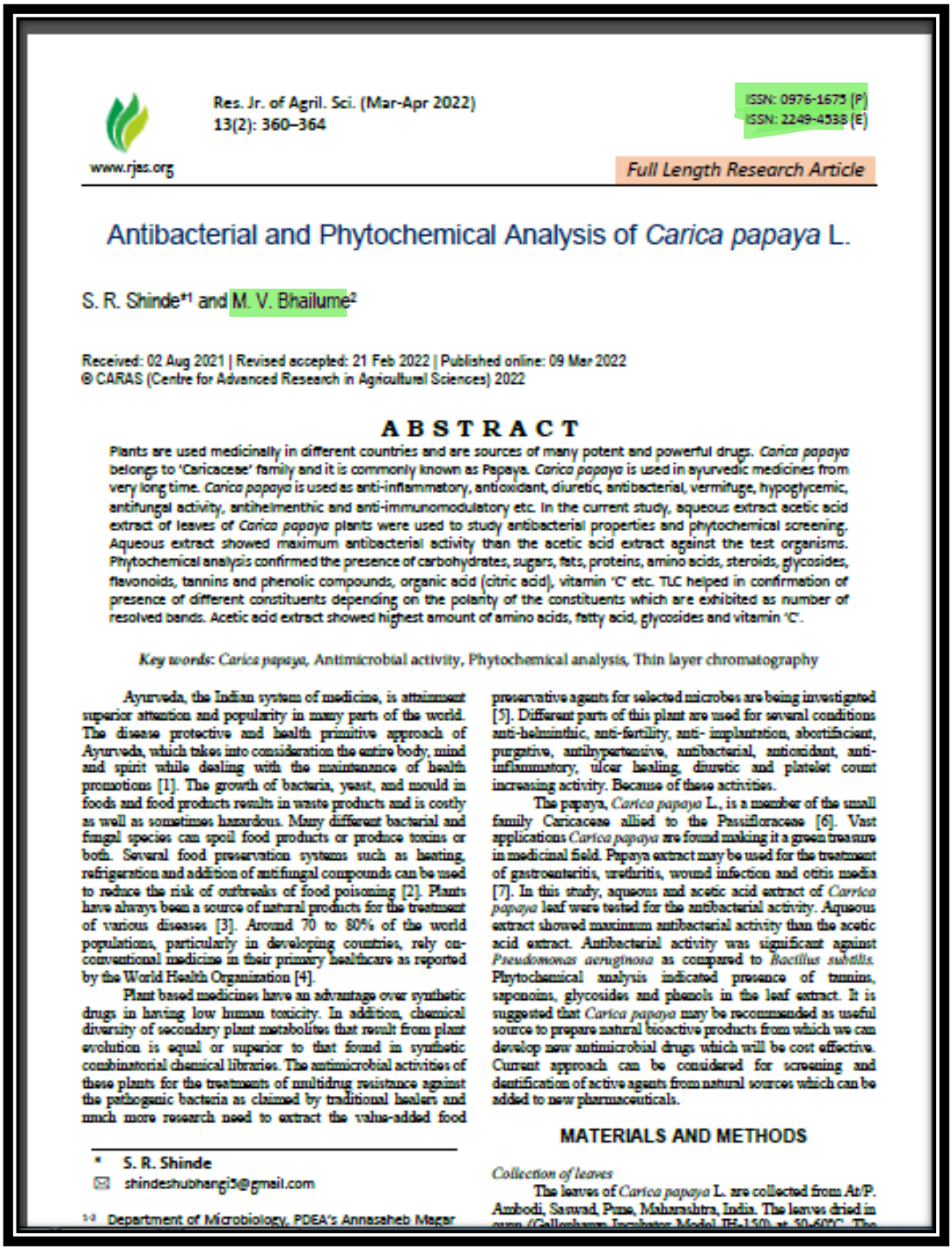
Table1 : Ecotoxicity of some synthetic dyes

Synthetic dyes	Ecotoxicity % / organism	Reference
Benzophenone	*Chlorella vulgaris* (44.10%)	[5]
Pyridine	Rabbit	[6]
Methyl eugenol	Rat, Mice	[7]
Benzophenone-3	*Scenedesmus obliquus* (23-29%)	[8]
Ethyl Acrylate	Rats and mice (31%)	[9]

Many natural pigments apart from fulfilling their function of giving colors are also known as interesting bioactive compounds with potential health benefits. These compounds have a wide range of application in medicine, food, pharmacology, agrochemical, cosmetics. Many microbial bioactive pigments have been discovered and lots of them show antioxidant, antimicrobial properties [10]. The natural bio colorantsobtained from plants and microorganismare alternative to synthetic pigments. The pigments that are naturally obtained from microbes are supreme over plants due to their several characteristics such as their great stability and solubility potential , they areavailable throughout the year, the fast growth rate

Author Name: Prof. Bhailume M. V.

32. Title of Paper: Antibacterial and Phytochemical Analysis of Carica papaya . L



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Full Length Research Article

Antibacterial and Phytochemical Analysis of *Carica papaya* L.

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ABSTRACT

Plants are used medicinally in different countries and are sources of many potent and powerful drugs. *Carica papaya* belongs to 'Caricaceae' family and it is commonly known as Papaya. *Carica papaya* is used in ayurvedic medicines from very long time. *Carica papaya* is used as anti-inflammatory, antioxidant, diuretic, antibacterial, vermifuge, hypoglycemic, antifungal activity, antihelmenthic and anti-immunomodulatory etc. In the current study, aqueous extract acetic acid extract of leaves of *Carica papaya* plants were used to study antibacterial properties and phytochemical screening. Aqueous extract showed maximum antibacterial activity than the acetic acid extract against the test organisms. Phytochemical analysis confirmed the presence of carbohydrates, sugars, fats, proteins, amino acids, steroids, glycosides, flavonoids, tannins and phenolic compounds, organic acid (citric acid), vitamin 'C' etc. TLC helped in confirmation of presence of different constituents depending on the polarity of the constituents which are exhibited as number of resolved bands. Acetic acid extract showed highest amount of amino acids, fatty acid, glycosides and vitamin 'C'.

Key words: *Carica papaya*, Antimicrobial activity, Phytochemical analysis, Thin layer chromatography

Ayurveda, the Indian system of medicine, is attainment superior attention and popularity in many parts of the world. The disease protective and health primitive approach of Ayurveda, which takes into consideration the entire body, mind and spirit while dealing with the maintenance of health promotions [1]. The growth of bacteria, yeast, and mould in foods and food products results in waste products and is costly as well as sometimes hazardous. Many different bacterial and fungal species can spoil food products or produce toxins or both. Several food preservation systems such as heating, refrigeration and addition of antifungal compounds can be used to reduce the risk of outbreaks of food poisoning [2]. Plants have always been a source of natural products for the treatment of various diseases [3]. Around 70 to 80% of the world populations, particularly in developing countries, rely on conventional medicine in their primary healthcare as reported by the World Health Organization [4].

Plant based medicines have an advantage over synthetic drugs in having low human toxicity. In addition, chemical diversity of secondary plant metabolites that result from plant evolution is equal or superior to that found in synthetic combinatorial chemical libraries. The antimicrobial activities of these plants for the treatments of multidrug resistance against the pathogenic bacteria as claimed by traditional healers and much more research need to extract the value-added food preservative agents for selected microbes are being investigated [5]. Different parts of this plant are used for several conditions anti-helminthic, anti-fertility, anti- implantation, abortifacient, purgative, antihypertensive, antibacterial, antioxidant, anti-inflammatory, ulcer healing, diuretic and platelet count increasing activity. Because of these activities.

The papaya, *Carica papaya* L., is a member of the small family Caricaceae allied to the Passifloraceae [6]. Vast applications *Carica papaya* are found making it a green treasure in medicinal field. Papaya extract may be used for the treatment of gastroenteritis, urethritis, wound infection and otitis media [7]. In this study, aqueous and acetic acid extract of *Carica papaya* leaf were tested for the antibacterial activity. Aqueous extract showed maximum antibacterial activity than the acetic acid extract. Antibacterial activity was significant against *Pseudomonas aeruginosa* as compared to *Bacillus subtilis*. Phytochemical analysis indicated presence of tannins, saponins, glycosides and phenols in the leaf extract. It is suggested that *Carica papaya* may be recommended as useful source to prepare natural bioactive products from which we can develop new antimicrobial drugs which will be cost effective. Current approach can be considered for screening and identification of active agents from natural sources which can be added to new pharmaceuticals.

MATERIALS AND METHODS

Collection of leaves

The leaves of *Carica papaya* L. are collected from At/P. Ambodi, Saswad, Pune, Maharashtra, India. The leaves dried in oven (Gallenkamp Incubator Model IH-150, at 30-60°C. The

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Microbial Assisted Reduction of Lead by River Isolate

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ABSTRACT

The present study deals with isolation and identification of heavy metal lead reducing microorganism from Mula-Mutha river, Pune, India. A strain was characterized based on its morphological and biochemical screening test. It was confirmed as *Bacillus cereus* ATCC 14579 by MALDI-TOF and 16S rRNA sequencing. The selected isolate successful in reducing lead up to 500 ppm. It showed maximum reduction potential up to 89 % in supernatant and 88% in pellet. The reduction of lead by that isolate was estimated by using atomic absorption spectroscopic studies. The isolate showed extracellular as well as intracellular bioaccumulation mechanism for the reduction of lead.

Key words: *Bacillus cereus* ATCC 14579, Bioreduction, Lead, Heavy metal.

1. INTRODUCTION

Around the globe the developing countries are facing the problem of heavy metal pollution. The persistent and non-degradable nature of heavy metal cause a serious threat to human health and the accumulation of these metals at different levels of the food chains also adds threat to plants, animals, aquatic life, and humans. Heavy metal ions in water are characterized by their toxicity, mobility to living beings even at low concentrations. Heavy metals cause significant environmental problems by their presence in water and soil, further which is aggravated by different anthropogenic activities. These anthropogenic activities convert metals into various forms that are highly toxic and persist for longer time in the environment [1].

Heavy metals refer as the metals which having specific gravity greater than 5.0 (or density 5.0g/cm3). There are 23 types of heavy metals which can have ill-effects because of exposure are: Au, Ga, V, U, Zn, Sn, Tl, Te, Ag, Pt, Ni, Hg, Mn, Pb, Fe, Co, Cu, Cr, Ce, Cd, Bi, As, Sb. Since the toxicity of a metals is linked with its different forms, it is worthwhile to know about different forms that are found in water bodies [2]. The heavy metals concentration in water bodies is increasing day by day. Even at low concentrations some heavy metals are highly toxic to human health and cause adverse effects on environment. These metals are silent, subtle, and stalking killers. The heavy metals like Fe, Mo and Mn have low toxicity while Zn, Ni, Cu, V, W, Cr, CO having average toxicity and some such as Sb, Cd, Hg, Pb, U, Ag are highly toxic. Toxic effects of some heavy metals on humans are given below (figure 1.)

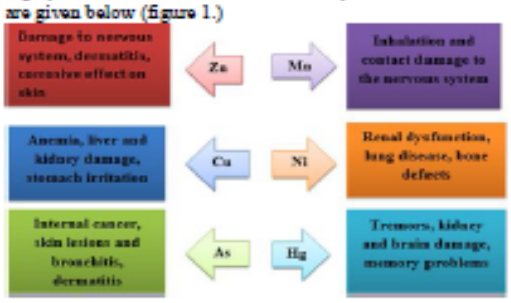
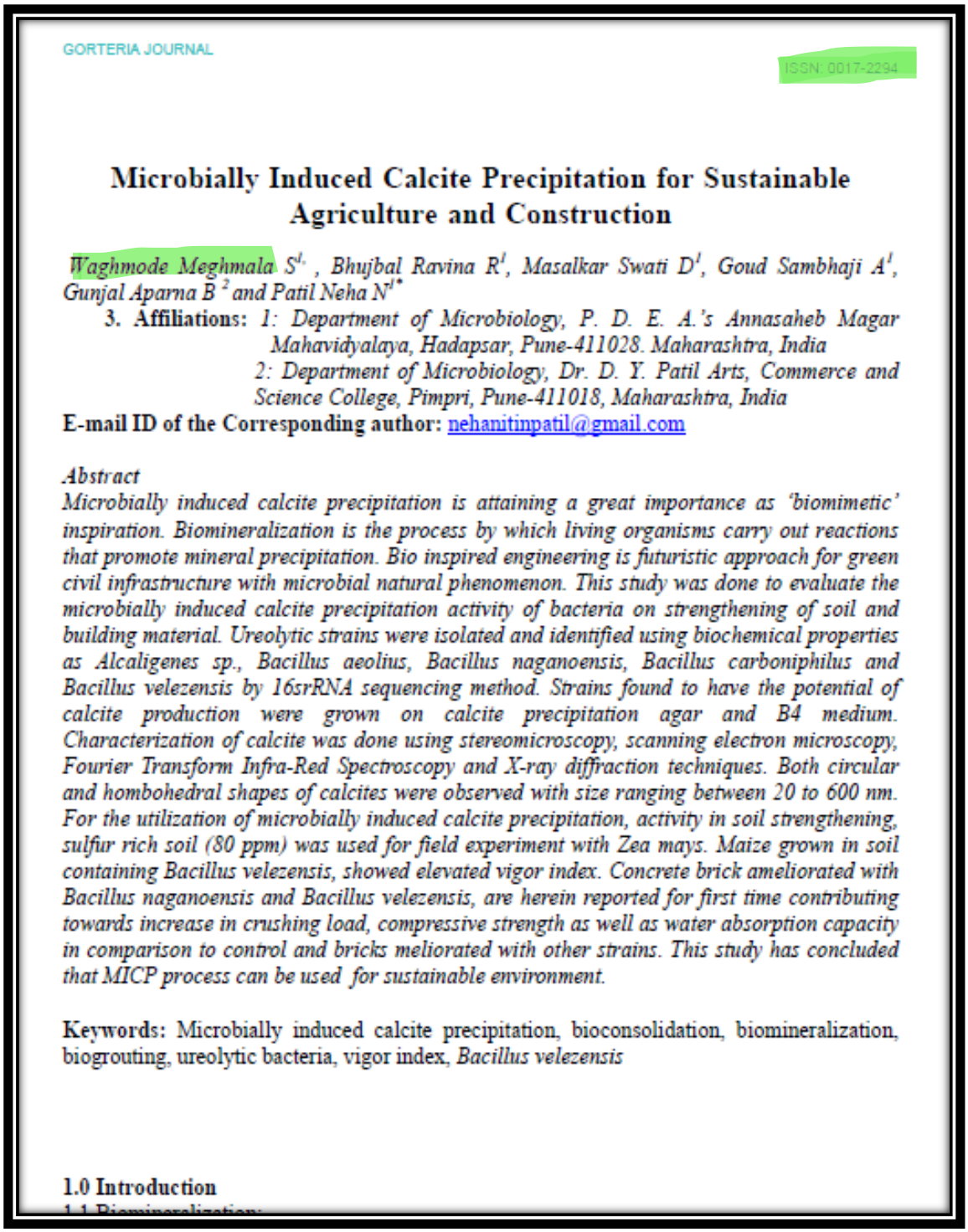


Figure 1: Effects of various heavy metals on human health.

lead is one of the non biosessential heavy metal which persist in environment for longer period and shown ecotoxicity in humans. Exposure to lead can result in wide range of biological effects which basically depends on the level and durations of exposure [3]. When exposure rate is high ultimately it results in toxic biochemical effects in humans which in turns cause problems in the synthesis of hemoglobin, effects on joints, reproductive system, kidneys, gastrointestinal tract and chronic or acute damage to nervous system. Even at minute concentrations lead being toxic, it is regarded to be one of the most toxic pollutants with primary sources from metal smelting industries, plumbing pipes, and manufacturing of insecticides [4]. Some natural processes like volcanic emissions, soil erosion and mineral mobilization also

Author Name: Prof. Waghmode M. S.

34. Title of Paper: Microbially Induced Calcite Precipitation for Sustainable Agriculture and Construction



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Microbially Induced Calcite Precipitation for Sustainable Agriculture and Construction

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Abstract

Microbially induced calcite precipitation is attaining a great importance as 'biomimetic' inspiration. Biomineralization is the process by which living organisms carry out reactions that promote mineral precipitation. Bio inspired engineering is futuristic approach for green civil infrastructure with microbial natural phenomenon. This study was done to evaluate the microbially induced calcite precipitation activity of bacteria on strengthening of soil and building material. Ureolytic strains were isolated and identified using biochemical properties as Alcaligenes sp., Bacillus aeolius, Bacillus naganoensis, Bacillus carboniphilus and Bacillus velezensis by 16srRNA sequencing method. Strains found to have the potential of calcite production were grown on calcite precipitation agar and B4 medium. Characterization of calcite was done using stereomicroscopy, scanning electron microscopy, Fourier Transform Infra-Red Spectroscopy and X-ray diffraction techniques. Both circular and hombohedral shapes of calcites were observed with size ranging between 20 to 600 nm. For the utilization of microbially induced calcite precipitation, activity in soil strengthening, sulfur rich soil (80 ppm) was used for field experiment with Zea mays. Maize grown in soil containing Bacillus velezensis, showed elevated vigor index. Concrete brick ameliorated with Bacillus naganoensis and Bacillus velezensis, are herein reported for first time contributing towards increase in crushing load, compressive strength as well as water absorption capacity in comparison to control and bricks meliorated with other strains. This study has concluded that MICP process can be used for sustainable environment.

Keywords: Microbially induced calcite precipitation, bioconsolidation, biomineralization, biogrouting, ureolytic bacteria, vigor index, *Bacillus velezensis*

1.0 Introduction

Author Name: Dr. Mundhe A. Y.

35. Title of Paper: Evaluation of Stress of Environmental Relevant Concentration of Glyphosate Pesticide on Lamellidens Marginalis

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EVALUATION OF STRESS OF ENVIRONMENTAL RELEVANT CONCENTRATION OF GLYPHOSATE PESTICIDE ON *LAMELLIDENS MARGINALIS*

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ABSTRACT

We evaluated glyphosate (GLP) toxicity on *Lamellidens marginalis* by using oxidative and genotoxic stress markers. The study provides evidence of oxidative stress and altered activities of antioxidative enzymes in bivalve (gill, foot, mantle, muscle, and hepatopancreas) upon exposure to an environmentally relevant concentration of glyphosate organophosphate pesticide (1 mg l^{-1}). The GLP exposure periods were 7 (T1) and 14 (T2) days, followed by a recovery period of 4 days (R1 & R2) respectively. GLP exposure showed a positive correlation between oxidative stress and duration of exposure. A catalase induction trend was observed in both the treated groups. Induction or inhibition of Super oxide dismutase (SOD) enzyme activities were tissue-specific after GLP exposure. The technical grade GLP has genotoxic potential, studied with the help of comet assay on gill tissues. Longer duration of exposure has significantly increased comet parameters such as tail length, tail DNA percentage as well as olive tail movement as compared to control bivalve. However, bivalves recovered significantly after the four days of the recovery period. The results suggested oxidative stress and genotoxic potential of GLP, evidenced by altered activities of antioxidative enzymes and induction of comet parameters. Even though, the animals experienced the stress of GLP exposure, however, recovery potential of bivalves was noteworthy after the removal of the stress.

KEY WORDS: Glyphosate, *Lamellidens marginalis*, Oxidative stress, Comet parameters Genotoxicity.

INTRODUCTION

Ideally, pesticides are toxic products designed to kill a target organism only; however, they also kill other non-target organisms such as the natural predators of the pest and also the organisms that are beneficial to health and to balance the ecosystem (WHO, 2003). Pesticides are biologically active substances, used for preventing, destroying, or controlling pests by interfering with their metabolic processes (Rice *et al.*, 2007).

Relatively a few pesticides' applications are made directly and exclusively on the target pests, and most application methods rely on the application of enough pesticides in the environment so that the exposure to the pest species reaches efficacious levels. It is known that less than 0.1 % of the applied pesticides actually reach the targeted pests, while the rest 99.9 % have the potential to move into other environmental compartments, including groundwater and surface water (Racke, 2003, Younos and Weigmann, 1988), which affect non-target organisms (Jarrell *et al.*, 2020).

As a part of the food chain *L. marginalis*, which acts as prey for birds and food for humans, accumulates a high concentration of pesticide than that of water (Dauberschmidt *et al.*, 1997), leads to the biomagnifications phenomenon.

The experimental animal *L. marginalis* is the most common bivalve found in the freshwater reservoirs around Pune, which is consumed as a major food item by a majority of the local population. Based on

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36 Title of Paper: A Survey on Microbial Pigments: Production and Applications.

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A Survey on Microbial Pigments: Production and Applications

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Abstract :*Pigments have become an essential part of our daily lives and have extensive applications in many areas such as food, cosmetics, agriculture, pharmaceuticals, textile. Since the 1980s synthetic pigments have been widely used in various applications. These synthetic pigments have adverse effects on environment and public health. The carcinogenicity or hyper allergenicity effects of synthetic dyes have led to increased research on natural pigments. Due to such drawbacks of synthetic pigments, the use of natural pigments are considered as the best alternative to synthetic pigments.Natural pigments from microorganisms are of great interest due to their significant properties and broader applications. The increasing demand among the consumers opting for natural pigments. To fulfill these market demand of natural pigments new sources should be explored. Among the natural resources, Microbial pigments represent an eco-friendly alternative as they can be produced in large amounts through biotechnological processes and do not present environmental risks, as they are easily decomposable. This review article highlights the various types of microbial pigments and the latest studies on the discovery of these pigments, the biosynthetic pathways and applications of these pigments which hopefully provides useful information, guidance and improvement in forthcoming studies.*

Keywords : Microbial pigment, Synthetic dye, Carotenoid, Violacein, Antimicrobial, Antioxidant

1.INTRODUCTION

Pigments are colorful secondary metabolites produced by microorganism. Since the prehistoric era pigments have been used as coloring agents. The first synthetic dye mauvine was prepared in 1856 by Sir William Henry Perkin. The historical revolution of synthetic dyes initiated by development of mauvine [1]. At first synthetic dyes get much attraction because of their different benefits like the development process for snthetic dyes is easy, they have good coloring properties, they required in very small amount for use. But most of the synthetic dyes that are used are never tested for their toxic effects[2]. Several studies show that synthetic dyes can cause adverse effects towards human health and have negative impact on environment. Some synthetic coloring agents which were originally approved by Food and Drug Administration (FDA) for use, were later found to cause cancer and hyperactive in children so they had been withdrawn from use due to their hazards impact on health [3]. The composition of synthetic dyes contain the chemical compounds like lead, copper, mercury, chromium, benzene, that have adverse effects on human being. The colorants that are obtained syntheticallyinclude ethyl acrylate, benzophenone, pyridin are banned by the FDA. In Washington the Center for Science in the Public Interest pleading to the FDA in 2008 to decline synthetic food colorants due to it's harmful effects among children [4]. The below (Table.1) shows some studies was done to investigate the ecological toxicity of some synthetic dyes to different orgnisms.

Table1 : Ecotoxicity of some synthetic dyes

Synthetic dyes	Ecotoxicity % / organism	Reference
Benzophenone	*Chlorella vulgaris* (44.10%)	[5]
Pyridine	Rabbit	[6]
Methyl eugenol	Rat, Mice	[7]
Benzophenone-3	*Scenedesmus obliquus* (23-29%)	[8]
Ethyl Acrylate	Rats and mice (31%)	[9]

Many natural pigments apart from fulfilling their function of giving colors are also known as interesting bioactive compounds with potential health benefits. These compounds have a wide range of application in medicine, food, pharmacology, agrochemical, cosmetics. Many microbial bioactive pigments have been discovered and lots of them show antioxidant, antimicrobial properties [10]. The natural bio colorantsobtained from plants and microorganismare alternative to synthetic pigments. The pigments that are naturally obtained from microbes are supreme over plants due to their several characteristics such as their great stability and solubility potential , they areavailable throughout the year, the fast growth rate

Author Name: Dr. Joshi A. M.

37. Title of Paper: Enzyme Activity of Raw Honey Harvested from Different Localities of Kannad Region, Aurangabad District (M. S.), India

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Enzyme activity of raw honey harvested from different localities of Kannad region, Aurangabad District (M. S.), India

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DOI: https://doi.org/10.22271/j.ento.2022.v10.i1d.8950

Abstract
The present study deals with the enzyme activity of honey samples harvested from three different locations of Kannad region of Aurangabad district (M. S.), India. Diastase and invertase activity were analyzed by using Schade *et al*., (1958) and Siegenthaler (1977) method respectively. Results clearly indicate that the honey harvested from agricultural and forest area shows highest enzyme activity than road side area. The values of enzymes in honey were varied from location to location. This study also clearly demonstrates thin viat honey harvested from Kannad region were fresh and unheated because the honey samples have more enzyme activity. The values of diastase and invertase were within the quality regulation limits proposed by Codex standards.

Keywords: Raw honey, diastase, invertase, enzyme activity, honey quality, Kannad region, etc.

Introduction
Honey is a sweet viscous food made by honeybees from the sugary secretions of plants such as nectar by regurgitation, enzymatic activity and water evaporation as well as store in wax structures called honeycombs [1]. Honey contains small amounts of different enzymes and the most important ones being diastase (α- and β-amylase), invertase (α-glucosidase), glucose oxidase, catalase and acid phosphatase, which comes from the nectar sources, salivary fluids and the pharyngeal gland secretions of the honeybee. The enzyme content in honey is one of the characteristics which make honey or its products different from other sweeteners.
The biochemical composition of honey varies greatly and it is mainly depends on the floral, regional and climatic conditions. Because of the great variation, lot of research has been carried out to classify and identify the origin of honey in relation to its physical and biological properties. To our knowledge, very limited study was carried on the relationship between the biochemical (enzymes) and nutritional components of honey. Often, the major concern of honey consumers, regardless of honey origin is the quality of honey. This relationship is very important for food processing industry, particularly for those industries using honey as ingredient in their food products [2].
The enzymes are closely related to the nutritional content and honey freshness. Even though enzymes are present in very small amount, they have significant effect on the quality of honey. This is because of the enzymes would significantly affect the protein content, free amino acid profile and acidity of honey samples. Mostly, enzymes found in honey samples were secreted from bee salivary fluids namely oxidases, catalases and amylases [3]. These enzymes would break down complex sugars into simple sugars such as fructose and glucose. The simple sugars might also be further catalyzed into alcohol and acetic acid under an appropriate amount of moisture content at the right temperature condition because of fermentation.
Besides affecting the pH value, the activity of enzymes might change the flavour and aroma of honey after fermentation [2]. Since enzymes are present in trace amount, many studies are likely to focus on sugar composition for the determination of honey origin [4]. Besides as macronutrient, the composition of monosaccharide and disaccharides as well as their ratios could be used to determine the degree of honey maturity. Usually, ripen honey samples have lower disaccharides such as sucrose and maltose content than those from honey harvested at an earlier stage. This is because most of disaccharides have been converted into monosaccharides by the action of enzymes. Hence, the predominant sugars and their ratios are crucial parameters for honey characterization [2].

Author Name: Prof. Joshi A. M.

38. Title of Paper: Assessment of essential minerals and toxic trace metals in blended raw honey, soil, leaf and flower samples harvested from different locations of Kannad Taluka of Aurangabad District

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Assessment of essential minerals and toxic trace metals in blended raw honey, soil, leaf and flower samples harvested from different locations of Kannad Taluka of Aurangabad District

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DOI: https://doi.org/10.22271/j.ento.2022.v10.i1d.8949

Abstract
The concentrations of eight essential minerals Ca, Cr, Co Cu, Fe, Mn, Ag, Zn and five toxic trace metals As, Cd, Pb, Hg and Ni were determined in blended raw honey, soil, leaf and flowers harvested from different locations of Kannad taluka. Result reveals that all honey samples from agricultural and road side area was contaminated with toxic trace metals. The honey samples harvested from forest area have no or lower concentrations of toxic trace metals than the permissible limits set by Indian standards (2010). The concentrations of these metals in honey samples investigated do not pose any serious concern to human health except honey harvested from road side area. Hence, the honey produced from Kannad taluka can be considered nutritionally safe and represents good quality. The present data also indicate that the levels of toxic trace metals in honey are comparatively more in roadway area than agricultural and forest areas. The essential minerals in soil, leaf and flower samples comparatively more in agricultural area than roadway and forest areas. The toxic trace metals are more in roadway sides than agricultural and forest areas.

Keywords: Heavy metals, human health, blended honey, permissible limits, Kannad taluka etc.

Introduction
Honey is the sweet substance produced by honeybees from the nectar of inflorescence, flower or from secretions on plants, which the bees collect, transform and store in honey combs [1]. The chemical composition of honey explains the numerous nutritional, healing and prophylactic properties. Honey contains sugar, proteins, vitamins, minerals, enzymes and some of bioactive components [2]. Heavy metals present above the admitted levels in raw honey by pollution standards are a threat to human health [3]. Nowadays, the international honey market trends are demanding good and more quality of honey. The raw materials for honey production were collected by different honeybee species from external environment; therefore it also contains pollutants [4]. Honeybees travel for their forage over several kilometers distance from the hives and they moderate effectively sample the environment for contaminants in plants, soil, and the atmosphere [5]. Honey reflects the chemical component of the many plants from which the bees collect their food and the content of trace elements that can specify the botanical origin of a specific honey [6, 7].
Pesticides and residues of antibiotics, minerals above permissible limits as well as toxic heavy metals are the possible honey contaminants. Therefore, the production of honey free from any harmful chemicals is utmost needed [8]. Mineral content primarily depends on the botanical origin and climatic as well as geographic conditions, but usually also on the type of soil where the honey plant grows [5].
The significant minerals present in honey originate from soil and later they are transported to trees through roots. The minerals make their way into the nectar and afterwards incorporated into the honey produced by bees [9]. Accordingly, the composition and the metal contents in honey, particularly major and minor metals are affected by the composition determined by

Author Name: Dr. Joshi A. M.

39. Title of Paper: Antifungal Activity of Raw Honey of Three Honeybee Species Harvested from Kannad Taluka of Aurangabad District (M. S.), India

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Antifungal Activity of Raw Honey of Three Honeybee Species Harvested from Kannad Taluka of Aurangabad District (M. S.), India

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Abstract: *The aim of present investigation was to study the antifungal activity of raw honey of three honeybee species collected from Kannad taluka of Aurangabad district. Honey samples were collected and assayed against three fungal species by using Agar well diffusion method. All honey samples showed sensitivity against all the fungal species. The zone of inhibition clearly showed that honey obtained from Apis florea and Apis cerana indica having highest antifungal activity, while honey sample of Apis dorsata showed minimum antifungal activity. The most sensitive fungi were Aspergillus and Fusarium, while Alternaria spp. was less sensitive to the inhibitory action of honey.*

Keywords: *Honey, Apis dorsata, Apis florea, Apis cerana indica, zone of inhibition, antifungal activity, sensitivity, etc.*

I. INTRODUCTION

Honey is defined as a sweet viscous natural fluid substance produced by honeybees from the nectar of blossoms, which the bees collect, transform and store in hexagonal wax like structure known as honey combs [1].

Scientific reports showed that honey exhibits important biochemical therapeutic activity as it cures various ailments [2]. Several studies showed the higher activity of honey over many known antibiotics [3]. Honey showed powerful antibacterial effect against pathogenic and non-pathogenic microorganism. [2] Molan (1996) in his earlier research reported that honey can accelerate man diseases healing activity and also had bactericidal properties. Honey is thus able to destroy all of the bacteria that cause surgical infections and also able to control post-operative wound infections caused by various bacterial species.

[4] Bashir (2009) reported, honey inhibits the growth of a wide range of microbes. Honey has several important properties and the sugar solution of honey has high osmolarity, which inhibits microfloral growth. Thus, the natural acidity of honey inhibits many pathogenic organisms.

The past two decades have brought a resurgence of interest in learning more about antimicrobial activity. Mould, yeasts and spore forming bacteria are primarily the microbes of great concern in honey. Microbiological characteristics of honey are inherent to quality and safety [5]. Certain fungi that can grow on food such as dried fruits, nuts, cereals, legumes and spices produces naturally-occurring toxins called mycotoxins. The most commonly observed mycotoxins are found aflatoxin (B1, B2, G1 and G2) and ochratoxin-A [6].

The use of honey as a traditional medicine for microbial infections dates back to ancient times. Its capability to kill microorganisms has been attributed to its high osmotic effect, high acidic nature, hydrogen peroxide concentration and its phytochemical nature [7]. Honey has wound healing and antimicrobial properties, but this is dependent on the type of honey, geographical location and flower from which the final product is obtained [8].

Antimicrobial agents are essentially important in reducing the global burden of infectious diseases. However, as resistant pathogens develop and spread, the effectiveness of the antibiotics is decreased. This type of bacterial resistance to the antimicrobial agents constitutes a very serious threat to public health and all kinds of antibiotics, including the major last-resort drugs, as the frequencies of resistance are increased worldwide [9, 10].

Honey possesses powerful antimicrobial properties that can be utilized at low cost and at no risk [111]. Various studies have reported the antimicrobial activity of honey [12]. Honey inhibits the growth of *Aspergillus flavus* and reduces aflatoxin B1 and B2 levels. The intrinsic properties of honey have been reported to affect the growth and survival of microorganisms by bacteriostatic actions [13, 14]. Its antifungal action has been observed against the yeast *Candida albicans* and most species of *Aspergillus baumannii* as well as *Penicillium chrysogenum* [15] and all the common dermatophytes also [16].

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Recently, honey has attracted attention within scientific community due to its potent antifungal activity [17, 18, 19]. Several researches on antifungal activity of honey had been reported against yeast *Candida albicans, Candida krusei, Cryptococcus neoformans, Aspergillus baumannii* and *Penicillium chrysogenum* as well as other common dermatophytes [20, 21].

Both the in vitro and in vivo studies have demonstrated that honey is an effective, broad spectrum and active antimicrobial agent against a wide variety of bacteria and fungi [22]. Several studies have investigated the antimicrobial properties of honey against bacteria; few have focused on its antifungal properties [23].

In recent years, there has been an escalating trend of fungal resistance to the current antifungal drugs accompanied with lack of efficacy and side effects. Thus, this fact has driven the research towards the study of antifungal agents from natural resources including honey [24].

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40. Title of Paper: Biofilm Inhibition in Candida Albicans with Biogenic Hierarchical Zinc Oxide Nanoparticles

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Biofilm inhibition in *Candida albicans* with biogenic hierarchical zinc-oxide nanoparticles

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ABSTRACT

The present study demonstrates lignin (L), fragments of lignin (FL), and oxidized fragmented lignin (OFL) as templates for the synthesis of zinc oxide nanoparticles (ZnO NPs) viz., lignin-ZnO (L-ZnO), hierarchical FL-ZnO, and OFL-ZnO NPs. The X-ray diffraction patterns confirmed the formation of phase pure ZnO NPs with a hexagonal wurtzite structure. Electron microscopy confirmed the hierarchical structures with one-dimensional arrays of ZnO NPs with an average particle diameter of 40 nm. The as-synthesized L-ZnO, FL-ZnO, and OFL-ZnO NPs were tested in-vitro for growth and virulence inhibition (morphogenesis and biofilm) in *Candida albicans*. L-ZnO, FL-ZnO, and OFL-ZnO NPs all inhibited growth and virulence. Growth and virulence inhibitions were highest (more than 90%, respectively at 125, 31.2, and 62.5 μg/mL) in presence of FL-ZnO NPs, indicating that the hierarchical FL-ZnO NPs were potent growth and virulence inhibiting agent than non-hierarchical ZnO NPs. Furthermore, the real-time polymerase chain (RT-PCR) was used to study the virulence inhibition molecular mechanisms of L-ZnO, FL-ZnO, and OFL-ZnO NPs. RT-PCR results showed that the downregulation of *phr1*, *phr2*, *efg1*, *hwp1*, *ras1*, *als3* and *als4*, and the upregulation of *bcy1*, *nrg1*, and *tup1* genes inhibited the virulence in *C. albicans*. Lastly, we also performed in-vitro test cell cytotoxicity on the cell line, mouse embryo 3T3L1, and in-vivo toxicity on Rats, which showed that FL-ZnO NPs were biocompatible and nontoxic.

1. Introduction

Candida albicans is a harmless commensal organism asymptomatically colonizing several niches in the body, including but not limited to the gastrointestinal (GI) tract, female reproductive tract, oral cavity, and skin [1–3]. However, under an altered immune system, or variation in the local environment such as pH, and antibiotics abuse or alteration in the nutritional status, *C. albicans* turns into an opportunistic pathogen, causing localized or systemic infections [4]. *C. albicans* shows physical plasticity called morphogenesis, in which the morphology of *C. albicans* switches from yeast form to hyphal form. As a result of morphogenesis, *C. albicans* can more easily penetrate mucous membranes, invade tissues, and enter the bloodstream, which increases the risk of tissue damage [5]. Morphogenesis also helps *C. albicans* to escape the phagocytosis of macrophages [6,7]. *C. albicans* also exhibit virulence through their ability to form biofilms on abiotic or biotic surfaces. Biofilms are communities of yeast, pseudohyphal and hyphal cells enclosed in a polymeric extracellular matrix (EPM) [8–10]. *C. albicans* are highly resistant to antimicrobial agents and host immune factors due to the complex architectures of biofilms [11–14]. The EPM in the biofilm provides structural integrity and protects cells from the surrounding environment. Thus, targeting the virulence systems - morphogenesis and biofilm - has become a promising strategy to stop the progression of *C. albicans*.

In the past, there have been attempts to design anti-virulence molecules, such as small molecules from microorganisms and plants [15,16], and nanozymes [17–19], to target the virulence system of *C. albicans*. Nanozymes such as citrate-coated Fe_3O_4 NPs were efficiently demonstrated to possess antibacterial activity over a wide range of pH by utilizing

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41. Title of Paper: SNS Donors as Mimic to Enzymes, Chemosensors, and Imaging Agents

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SNS donors as mimic to enzymes, chemosensors, and imaging agents

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ABSTRACT

This review summarizes multidentate SNS ligands as enzyme imitating models, chemosensors, and bioimaging agents. Due to the obvious prevalence of bioactive sulfur and nitrogen donors, SNS ligands have a substantial biological value. Sulfur-based tridentate ligands are frequently used to mimic the active sites of metalloproteins to truly comprehend enzyme active sites and have been used as building blocks to construct innovative model complexes. Metal complexes of such ligands, including Cu, Ni, Zn, Fe, Mo, and Co have been thoroughly investigated to imitate the enzymes. Chemosensors based on SNS donor and their functionalized polymers used for cation/anion and molecule detection, such as Al^{3+}, Pb^{2+}, Hg^{2+}, F^-, and glucose, have also been reviewed. The carcinogenic and psychiatric activity of trace metal ^{99m}Tc and ^{186}Re complexes with tridentate SNS moiety has been discussed *in vivo*, *in vitro*, and *in silico* for brain ailments, schizophrenic, and other neurodegenerative problems. Ligands having SNS moiety used as a radiotracer in bioimaging have been discussed. Other biological activity observed in gold complexes of SNS ligands, which have been administered as an antiparasitic medicine to manage Chagas disease, malaria, and other infectious diseases, has also been covered.

1. Introduction

A SNS tridentate ligand system is consists of biologically active elements such as 'S' and 'N'. Complexes of SNS donor ligands have been widely studied as catalysts, sensors, and bio-labeling agents; however, they have been less explored for their biological applications. The complexes of SNS ligands have attracted considerable attention due to their multifunctional, flexible, and stereoelectronic environment [1-3]. Such complexes have already been used in the manufacturing of industrial, pharmacological and horticultural chemicals [4-10], solar fuel [11], resins [12], and CO_2 fixation [6,13]. Protein and enzyme shared similar nitrogen and sulfur donors, and thus such complexes have a wide spectrum of biological consequences and have been leveraged to imitate enzymes [13-15]. Model complexes are artificial enzymes that represent enzymes and depict enzyme activity [16,17], giving structural and spectroscopic insights on metalloenzyme active sites [18,19], oxidation state etc. (see Fig. 1)Different sulfur and nitrogen-containing model complexes have been designed with Cu [20-22], Ni [23-26], Fe [27-29], Zn [30,31], and Co [32] metal ions, forming an active site that is important in the structure and activity of natural enzymes [33,34]. Based on the structure and reactivity of such complexes, the activity of a similar enzyme can be mimicked. Various complexes containing thiosemicarbazone [22,35], thiol [36,37], thiophenol [38-40] or thiocarbamide [41] moiety have found to show similar activity as compared to natural systems such as Hydrogenases [29,42], LADH [43], Cytochrome *C*, Oxidase [44], LarA [34,45], Nitrogenase [39] and Oxygenase [46-48] (see Fig. 2) .

Multidentate ligands with different metals have characteristic properties of luminescence which depend on the nature of metal as well as a ligand [49-51]. These complexes have been employed as chemosensors or biosensors. Their luminescence behavior is attributed due to either metal to ligand charge transfer (MLCT) or ligand to metal charge transfer (LMCT), or metal to metal to ligand charge transfer [52-54]. Transition metal complexes of spiropyran, spiroxazine, azobenzene, and diarylethenes ligands have been found to show significant photoelectric effect and good sensing properties [55]. This is due to their suitable bandgap, atomically flat surface topography, and the absence of dangling bonds and strong covalent bonds within the layers [56]. Several chemosensors containing sulfur and nitrogen donor atoms have been developed for metal ion detection [57-60]. Tridentate SNS ligands have been utilized for the detection and removal of toxic metal due to

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42. Title: Microbial Cell Factories Management of Pharmaceutical Micropollutant

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Review

Microbial Cell Factories for the Management of Pharmaceutical Micropollutants

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ABSTRACT
Extensive use of pharmaceutical drugs and its disposal in soil and water reservoirs leads to serious environmental pollution. These pharmaceutical micropollutants are highly water soluble, low biodegradable and easily accumulated in the food chain. Thus, these micropollutants persist in the environment and may cause a serious threat to ecosystem. This review highlights the sources of pharmaceutical micropollutants and adverse effects on ecosystem. The pharmaceutical drugs such as anti-convulsive drugs, antidepressants and cytostatic drugs are more ecotoxic, hence need to remove them from contaminated environments. Further, review also insights the importance of microbial degradation in management of pharmaceutical pollutions.

Key words: Bioremediation, ecotoxicity, micro pollutants, bioaccumulation, Covid-19

INTRODUCTION

Increasing multidrug resistance in microorganisms and development of several diseases which leads to increasing drug usage. During COVID-19 situation, several antiviral drugs, steroids and painkillers are used which results into discharge of drugs in the environment (Nippes et al. 2021, Gwenzi et al. 2022). Environmentally acquired drug resistance in human pathogens has been observed. For example, Oseltamevir and Tamiflu developed Influenza A virus resistance in wild fowl reported previously (Fick et al. 2007, Singer et al. 2007, Kuroda et al. 2021). Domestic, industrial and hospital activities are responsible for discharge of several pharma micropollutants in the aquatic environment (Ribeiro et al. 2015). The existence of active ingredients of pharmaceuticals and personal care products (PCPs) in the environment are also detected (Brausch and Rand 2011, Montesdeoca et al. 2018). It is investigated that both steroidal and non-steroidal drugs are detected in water and soil environment (Ghlichloo and Gerriets 2021).

The drugs such as diclofenac, azithromycin, clarithromycin and erythromycin are considered as emerging contaminants in the environment (Ribeiro et al. 2015). The diclofenac has been detected in drinking water in range of 0.02 ng/L to 20.00 µg/L (Simazaki et al. 2015). It was also studied that diclofenac and its metabolites such as 42 -hydroxy-DCF and 5-hydroxy-DCF are found in wastewater (Bouju et al. 2016). Other contaminants mixture of non-steroidal anti-inflammatory drugs like diclofenac, ibuprofen, naproxen, and acetylsalicylic acid are considered as serious threat to the environment and human health (Cleuvers 2004). Therefore, management of such harmful contaminants is of prime importance. The techniques such as nanofiltration and reverse osmosis are suggested by several researchers for the treatment of contaminated water bodies (Radjenovic et al. 2008). Some conventional methods such as sewer, combustion, or land disposal are used for disposal of pharma products (Ivshina et al. 2006).

Recently, other processes like advanced oxidation and solar photodegradation are recommended for removal of diclofenac from surface water (Leónidas et al. 2005). Implementation of physicochemical methods for the removal of cytostatic compounds (ecotoxic) at the site of origin and utilization is difficult as compared to biological method (Bhattacharyya et al. 2022).

Impact of Pharmaceutical Micropollutants on Ecosystem

Pharmaceutical products are the primary concern in aquatic environment (Patel et al. 2019). They have (Abdalla and Hammam 2014). The Pilot study has been carried out for the applicability of disinfection process for the more than 50% removal of residual concentration of anti-inflammatory and anti-

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43 Effect of Storage on Various Honey Quality Parameters of Apis mellifera Honey Harvested from Kannad Region, Aurangabad

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Effect of storage on various honey quality parameters of *Apis mellifera* honey harvested from Kannad region, Aurangabad

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Abstract
The present study deals with the effect of storage on *Apis mellifera* honey quality parameters harvested from Kannad taluka of Aurangabad district (M.S.), India. Honey quality parameters like pH, electrical conductivity, moisture content, proline content, HMF content, invertase and diastase activity were measured by AOAC method (2000) at intervals of each six month for the period of 24 month. Student's T-Test was applied to the analyzed data. Results clearly indicates that the pH, electrical conductivity, moisture content and HMF content were increased with the increasing of storage period and concentration of proline, invertase and diastase number were decreased with the increasing of storage time limit. The said physicochemical parameters of honey sample were found statistically significant according to their storage time limit. The obtained data also clearly demonstrate that the invertase is more sensitive than the diastase and HMF content to the storage as well as heat treatment of honey.

Keywords: honey, physicochemical parameters, storage period, invertase, diastase activity, HMF content, etc.

Introduction
Honey is defined as a naturally occurring sweet substance produced by honeybees from the nectar of plants or from secretions of living plants parts. Honey bees collect and transform these raw materials and combine them with specific substances of their own and deposit, dehydrate and store honey in honeycombs to ripen and mature [1]. It is also known as the concentrated aqueous solution of invert sugar. Honey makes complex chemical composition, because it contains a mixture of other carbohydrates, amino and organic acids, minerals, aromatic substances, pigments waxes as well as pollen grains [2, 3].
Honey is generally evaluated by a physicochemical analysis of its own constituents. These constituents include the storage quality, granulation, texture, flavor and the nutritional quality of the honey are of great importance to the honey industry, which are also responsible for the medicinal quality of honey. The International Honey Commission (IHC) has therefore proposed certain constituents as quality criteria for honey. These constituents include moisture content, electrical conductivity, reducing sugars, sucrose content, minerals, free acidity and hydroxymethylfurfural [4].
Following are the parameters that can be responsible for the freshness of honey, depends on their normal range which is set by Codex Alimentarius standards [5, 6] as well as European Union Honey Directive [1].
pH is an important parameter during the extraction and storage of honey. It influences honey texture, stability and shelf life [7]. In general, a low pH of honey inhibits the growth and proliferation of microorganisms. According to Codex Alimentarius standards [5, 6], the normal range of pH in honey is 3.4 to 6.1. If the pH is increases or decreases above or below the normal range, then several undesirable changes occurs in honey and therefore the honey is not suitable for human consumption.
The electrical conductivity is related to the concentration of organic acids, proteins, and mineral salts in honey [8]. Since the electrical conductivity of honey depends on the flower, in which the bee receives nectar from flowers. It is an important parameter for the indication of honey freshness obtained from different flowers [9, 10]. According to Codex Standard [5, 6], the electrical conductivity of honey should be less than 0.8 mS/cm.
Higher moisture content might be cause unwanted honey fermentation during storage and that leads to formation of acetic acid [11]. Conspicuously, the moisture content of honey depends on various factors, such as the harvesting season, the degree of maturity reached in the hive, and

the geographic and environmental factors [12, 13]. Moisture content in honey should not be exceeds than 21% according to international regulations set by Codex Alimentarius standards [5, 6]. The disturbance in normal range can cause the honey unsuitable for mankind in their daily life diet.
Proline is dominant amino acid found in honey, and has been considered as an indicator of quality and freshness of honey [14]. Also its freshness is depends on heat treatment, honey processing and storage time period. The proline content in honey mainly depends on the time that nectar is processed by the bees [15]. Previous studies found that the proline content of honey was associated with its floral source and geographical origin [16]. Moreover, proline content has been used as an indicator of honey ripeness and sugar adulteration when it falls below a value of 180 mg/kg [17, 18]. Therefore, proline content is a critical marker for the authentication of honey quality [19, 20].
In honey, several harmful and toxic compounds such as HMF may be present and they possibly showed their effect when consumed by humans. Several studies have been shown that the compound has adverse effects of causing mutation, toxic genetically and carcinogenic in mice [21] and it also has

month, 150 gm sample were taken for physicochemical analysis for a period of 24 month.
In this study, the pH was measured by using pH meter (pHep, pocket sized Hanna instrument, Portugal), electrical conductivity was measured by conductivity meter (HI96301-2, Hanna instrument, Portugal), moisture content was measured by refractometer, Hydroxymethylfurfural content (HMF) was determined as per spectrophotometric method described by [22] White (1979), proline was estimated by using ninhydrin method [23], diastase and invertase activity was determined as per method described by [24] Schade (1958), [25] Siegenthaler (1977) respectively. The data was analyzed by applying Student's T-Test.

Results and Discussion
In the present study storage effect of honey on their physicochemical parameters and enzyme activity were studied with regular four intervals of six months in Table No. 1 and Fig. No. 1, 2, 3, 4, 5, 6 and 7.
Among the different physicochemical parameters, hydroxymethylfurfural (HMF) content, diastase activity and

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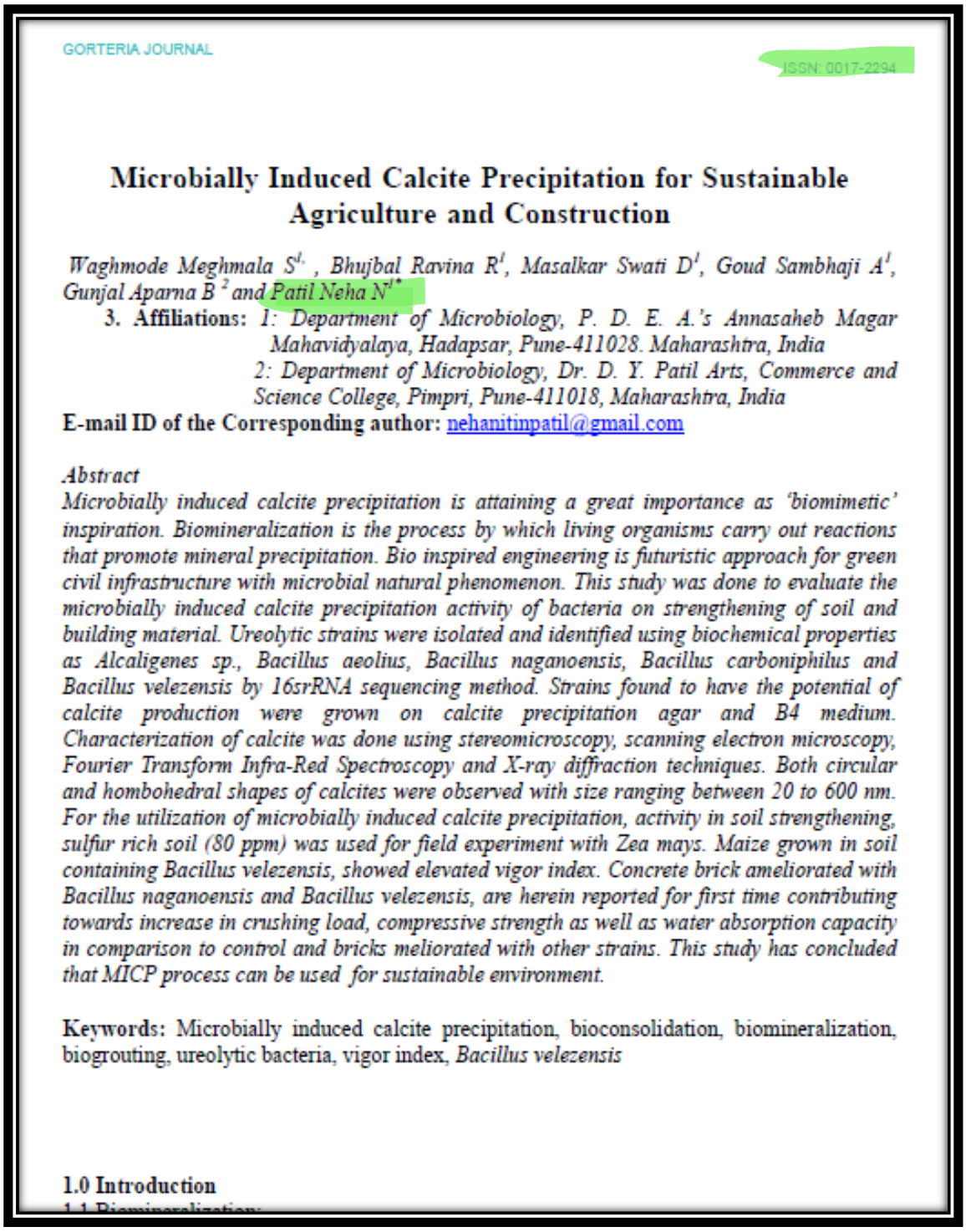
44. Title of Paper: Microbially Induced Calcite Precipitation for Sustainable Agriculture and Construction



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Microbially Induced Calcite Precipitation for Sustainable Agriculture and Construction

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Abstract

Microbially induced calcite precipitation is attaining a great importance as 'biomimetic' inspiration. Biomineralization is the process by which living organisms carry out reactions that promote mineral precipitation. Bio inspired engineering is futuristic approach for green civil infrastructure with microbial natural phenomenon. This study was done to evaluate the microbially induced calcite precipitation activity of bacteria on strengthening of soil and building material. Ureolytic strains were isolated and identified using biochemical properties as Alcaligenes sp., Bacillus aeolius, Bacillus naganoensis, Bacillus carboniphilus and Bacillus velezensis by 16srRNA sequencing method. Strains found to have the potential of calcite production were grown on calcite precipitation agar and B4 medium. Characterization of calcite was done using stereomicroscopy, scanning electron microscopy, Fourier Transform Infra-Red Spectroscopy and X-ray diffraction techniques. Both circular and hombohedral shapes of calcites were observed with size ranging between 20 to 600 nm. For the utilization of microbially induced calcite precipitation, activity in soil strengthening, sulfur rich soil (80 ppm) was used for field experiment with Zea mays. Maize grown in soil containing Bacillus velezensis, showed elevated vigor index. Concrete brick ameliorated with Bacillus naganoensis and Bacillus velezensis, are herein reported for first time contributing towards increase in crushing load, compressive strength as well as water absorption capacity in comparison to control and bricks meliorated with other strains. This study has concluded that MICP process can be used for sustainable environment.

Keywords: Microbially induced calcite precipitation, bioconsolidation, biomineralization, biogrouting, ureolytic bacteria, vigor index, *Bacillus velezensis*

1.0 Introduction

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Microbial Assisted Reduction of Lead by River Isolate

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ABSTRACT

The present study deals with isolation and identification of heavy metal lead reducing microorganism from Mula-Mutha river, Pune, India. A strain was characterized based on its morphological and biochemical screening test. It was confirmed as *Bacillus cereus* ATCC 14579 by MALDI-TOF and 16S rRNA sequencing. The selected isolate successful in reducing lead up to 500 ppm. It showed maximum reduction potential up to 89 % in supernatant and 88% in pellet. The reduction of lead by that isolate was estimated by using atomic absorption spectroscopic studies. The isolate showed extracellular as well as intracellular bioaccumulation mechanism for the reduction of lead.

Key words: *Bacillus cereus* ATCC 14579, Bioreduction, Lead, Heavy metal.

1. INTRODUCTION

Around the globe the developing countries are facing the problem of heavy metal pollution. The persistent and non-degradable nature of heavy metal cause a serious threat to human health and the accumulation of these metals at different levels of the food chains also adds threat to plants, animals, aquatic life, and humans. Heavy metal ions in water are characterized by their toxicity, mobility to living beings even at low concentrations. Heavy metals cause significant environmental problems by their presence in water and soil, further which is aggravated by different anthropogenic activities. These anthropogenic activities convert metals into various forms that are highly toxic and persist for longer time in the environment [1].

Heavy metals refer as the metals which having specific gravity greater than 5.0 (or density 5.0g/cm3). There are 23 types of heavy metals which can have ill-effects because of exposure are: Au, Ga, V, U, Zn, Sn, Tl, Te, Ag, Pt, Ni, Hg, Mn, Pb, Fe, Co, Cu, Cr, Ce, Cd, Bi, As, Sb. Since the toxicity of a metals is linked with its different forms, it is worthwhile to know about different forms that are found in water bodies [2]. The heavy metals concentration in water bodies is increasing day by day. Even at low concentrations some heavy metals are highly toxic to human health and cause adverse effects on environment. These metals are silent, subtle, and stalking killers. The heavy metals like Fe, Mo and Mn have low toxicity while Zn, Ni, Cu, V, W, Cr, CO having average toxicity and some such as Sb, Cd, Hg, Pb, U, Ag are highly toxic. Toxic effects of some heavy metals on humans are given below (figure 1.)

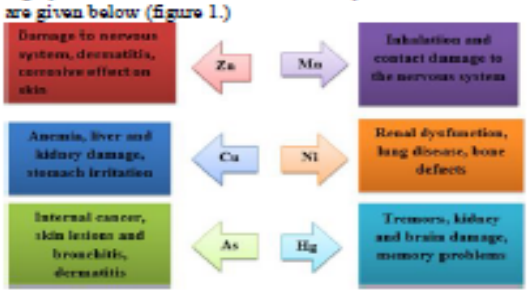

Figure 1: Effects of various heavy metals on human health.

lead is one of the non biosessntial heavy metal which persist in environment for longer period and shown ecotoxicity in humans. Exposure to lead can result in wide range of biological effects which basically depends on the level and durations of exposure [3]. When exposure rate is high ultimately it results in toxic biochemical effects in humans which in turns cause problems in the synthesis of hemoglobin, effects on joints, reproductive system, kidneys, gastrointestinal tract and chronic or acute damage to nervous system. Even at minute concentrations lead being toxic, it is regarded to be one of the most toxic pollutants with primary sources from metal smelting industries, plumbing pipes, and manufacturing of insecticides [4]. Some natural processes like volcanic emissions, soil erosion and mineral mobilization also