॥ GYAN SEVA TYAG ॥

Shri Vyanknath Shikshan Prasarak Mandal's

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR

Taluka: Radhanagari, District: Kolhapur (Maharashtra, India). Pincode: 416212

Email: spvmsolankur@gmail.com, spvms416cl@gmail.com

Website: www.spsc.ac.in

Affiliated to Shivaji University Kolhapur, MS, India | Accredited by NAAC with 'B' Grade (CGPA=2.44)

Shri. A. Y. Patil
Secretary

Shri. R. Y. Patil
Chairman

Activity Report: Faculty exchange programme under MoU

(Academic Year: 2022-23)

Name of the activity	-	**Guest lecture on "Pharmaceuticals"**
Organized by	-	Doodhsakhar Mahavidyalaya, Bidri
Date of Activity	-	**7th February 2023**
Time	-	11.00 am
Venue	-	Auditorium Hall, DMB, Bidrti
Total Number of participants	-	All T. Y. B. Sc. Students, Department of Chemistry, DM, Bidri
Name of Faculty	-	Mr. J. K. Chavan
Objective	-	Collaboration in teaching, research and development, and consultancy studies in the field of mutual intrest,

Head
Department of Chemistry
Shri. Yashwantrao Patil Science College, Solankur.

Shri Yashwantrao Patil Science College Est Jun 2009 Dist Kolhapur

PRINCIPAL
Shri Yashwantrao Patil Science College,
Solankur, Tal. Radhanagari, Dist. Kolhapur.

Some Photos of Faculty Exchange Programme

Head
Department of Chemistry
Shri. Yashwantrao Patil Science College, Solankur.

Shri Yashwantrao Patil Science College Est. Jun 2009 Dist Kolhapur Solankur Tal. Radhanagari

PRINCIPAL
Shri Yashwantrao Patil Science College,
Solankur, Tal. Radhanagari, Dist. Kolhapur.

॥ GYAN SEVA TYAG ॥
Shri Vyankatesh Shikshan Prasarak Mandal's
SHRI YASHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR
Taluka: Radhanagari, District: Kolhapur (Maharashtra, India). Pincode: 416212
Email: [illegible] Website: www.[illegible]
Affiliated to Shivaji University, Kolhapur, MS, India || Accredited by NAAC with 'B' Grade (CGPA=2.14)
Shri. A. Y. Patil
Secretary
Shri. R. Y. Patil
Chairman

Activity Report: Faculty exchange programme under MoU

(Academic Year: 2022-23)

Name of the activity	-	**Guest lecture on "Chemical Kinetics"**
Organized by	-	Doodhsakhar Mahavidyalaya, Bidri
Date of Activity	-	**7th February 2023**
Time	-	01.00 pm
Venue	-	Auditorium Hall, DMB, Bidrti
Total Number of participants	-	All T. Y. B. Sc. Students, Department of Chemistry, DM, Bidri
Name of Faculty	-	Dr. A. D. Kamble
Objective	-	Collaboration in teaching, research and development, and consultancy studies in the field of mutual intrest,

Head
Department of Chemistry
Shri. Yashwantrao Patil Science College, Solankur.

Shri Yashwantrao Patil Science College, Tal. Radhanagari, Dist. Kolhapur, Est. Jun 2009

PRINCIPAL
Shri Yashwantrao Patil Science College,
Solankur, Tal. Radhanagari, Dist. Kolhapur.

Photos of Faculty Exchange Programme

Head
Department of Chemistry
Shri. Yashwantrao Patil Science
College, Solankur.

Shri Yashwantrao Patil Science College Est. Jun 2009 Dist Kolhapur Solankur Tal. Radhanagari

PRINCIPAL
Shri Yashwantrao Patil Science College,
Solankur, Tal. Radhanagari, Dist. Kolhapur.

Government of Maharashtra
Estd :1880
Rajaram College, Kolhapur
Department of Zoology
Eco-Prithvi Club
Vidyanagar, Kolhapur 416004
E-Mail: rckzoology@gmail.com

No. RCK/Zoo/2023/

Date: 10 /03 /2023

To,

The Head
Department of Zoology
Shri. Yashwantrao Patil
Vidnyan Mahavidyalaya, Solankur

Subject: Invitation for Bio-Genius Competition.

Respected Madam,

With reference to above subject, we are organizing State level Bio-Genius Competition organized by Eco-Prithvi club, Department of Zoology, Rajaram College Kolhapur, in collaboration with Department of Zoology, Government Vidarbha Institute of Science and Humanities (Autonomous), Amravati, on 14th March, 2023 at 12:00 pm. Kindly send at least 10 UG/PG students for participation in this Competition.

Head, Department of Zoology
Rajaram College Kolhapur
Head of the Zoology Department
Rajaram College Kolhapur

|| GYAN SEVA TYAG ||
Shri Vyanknath Shikshan Prasarak Mandal's
SHRI YASHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR
Taluka: Radhanagari, District: Kolhapur (Maharashtra, India). Pincode: 416212
Email: ypvmsolankur@gmail.com / ypvms.436.cl@gmail.com
Website: www.ypsc.ac.in
Affiliated to Shivaji University Kolhapur, MS, India | Accredited by NAAC with 'B' Grade (CGPA=2.14)
Shri. A. Y. Patil
Secretary
Shri. R. Y. Patil
Chairman

Date: 01/03/2023

Telescope Making Workshop

(Hands on Training Program)

Activity Report

Department of Physics, Shri Yashwantrao Patil Science College Solankur in collaboration with The New College, Kolhapur had organized and successfully conducted Telescope Making Workshop under MoU Activity on 01/03/2023 at conference hall of New College, Kolhapur. The workshop was specially designed for school children to enrich their knowledge about instrumental and observational astronomy.

The students were introduced the theoretical background of telescopes, their types, their mounts, steps involving in the process of telescope making through PPT presentation and trained them to built telescope by their own. 13 students were participated from kolhapur and sangali district. After assembling, participants were also trained to find and focus the celestial objects.

Dr. A. A. Jatratkar has worked as trainer for the workshop and guided students. As, it was the MoU activity, Teaching staff of Physics department of both colleges were actively involved in the workshop.

Dr. R. B. Patil, Dr. S. H. Tamboli, Dr. P.D. Kamble, Dr. A. A. Kalgonda, Mrs. S. S. Pawar, Mr. S. K. Sutar, Principal Dr. G. G. Chougale, Principal Dr. V. M. Patil have supported and provided all the necessary facilities.

Shri Yashwantrao Patil Science College
Est. Jun 2009 Dist.Kolhapur
Solankur Tal Radhanagari

Shri Yashwantrao Patil Science College
Est.
Jun 2009
Dist.Kolhapur
Tal.Radhanagari

सकाळ

कोल्हापूर : न्यू कॉलेजमध्ये खगोलीय दुर्बीण निर्मिती कार्यशाळेत उपस्थित विद्यार्थी, पालक व शिक्षक.

न्यू कॉलेजमध्ये खगोलीय दुर्बीण निर्मिती कार्यशाळा

कोल्हापूर, ता. ३ : सोळांकूर येथील श्री यशवंतराव पाटील विज्ञान महाविद्यालय आणि न्यू कॉलेज यांच्या भौतिकशास्त्र विभागांच्या संयुक्त विद्यमाने खगोलीय दुर्बीण निर्मिती कार्यशाळा झाली.

डॉ. अविराज जत्राटकर यांनी मार्गदर्शन केले. दुर्बिणी तयार करण्यासाठी आवश्यक असणारे साहित्य निवडण्यापासून ते त्यापासून दुर्बीण तयार करण्यापर्यंत सर्व प्रशिक्षण विद्यार्थ्यांना देण्यात आले. प्राचार्य डॉ. जी. जी. चौगले, प्राचार्य डॉ. व्ही. एम. पाटील, डॉ. राहुल पाटील, डॉ. सिकंदर तांबोळी, डॉ. ए. ए. कलगोंडा, डॉ. प्रदीप कांबळे, एस. के.सुतार उपस्थित होते. प्रास्ताविक स्वप्नाली पवार यांनी केले. रेश्मा बेडगकर यांनी आभार मानले.

Kolhapur | Kolhapur-Today
04/03/2023 | Page No. 5

स्थापना: १९९४

नॅक पुर्नमुल्यांकन :B++ (सीजीपीए- 2.६

"सर्वांग सुंदर जीवन यासाठी शिक्षण"

ज्ञानसाधना शिक्षण प्रसारक मंडळ, निवडे संचलित

म.ह.शिंदे महाविद्यालय,तिसंगी

ता. गगनबावडा,जि. कोल्हापूर ४१६ २०६

(शिवाजी विद्यापीठ, कोल्हापूर संलग्नीत)

वेब साईट : www.mhstcollege.in

ई मेल आयडी :mhstisangi@rediffmail.com

ाचार्य डॉ. बी . एस . पडवळ

एम . कॉम . . एम . लिब ॲन्ड इन्फ . सायन्स . . एम . फिल . . पीएचडी

फोन ऑफिस : (०२३२६) २५४९४८

मोबाईल:९४२१९९९९२५

जा. क्र एमएचएसटी / २०२२-२३ / 57

दिनांक: / /

13 MAY 2022

To,

Dr. S. V. Madhale,

Head Department of Botany,

Shri. Yashwantrao Patil Science Mahavidyalaya,

Solankur, Kolhapur.

Subject: Letter of Appreciation.

Dear Sir,

We are really grateful to you for giving a lecture on the topic **"Lipid Metabolism"** to our students, on 13th May 2022 organized by Department of Botany under faculty exchange program. Our students are enlightened by your guidance. This will be helpful to all students for their career development. We thank you for extending cooperation.

Thanking you,

Yours faithfully,

HC PRINCIPAL

M. H. Shinde Mahavidyalaya, Tisan

Tal. Gaganbavda, Dist. Kolhapur

॥ GYAN SEVA TYAG ॥

SHRI VYANKNATH SHIKSHAN PRASARAK MANDAL'S

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR

(Affiliated to Shivaji University Kolhapur, MS, India; Accredited by NAAC with 'B' Grade (CGPA=2.14)

DEPARTMENT OF BOTANY

is organizing

State Level Workshop and Hands on Training of

MUSHROOM CULTIVATION AND POST HARVEST PROCESSING

Date: 4th November, 2022

RESOURCE PERSON

Mr. Parimal Ramesh Udgave
Founder and Director,
Biobrite Agro Solutions Private Limited, Kolhapur

CONVENERS

Dr. M. S. Sutare
Assistant Professor,
Department of Botany

Dr. S. P. Dorugade
Assistant Professor,
Department of Botany

Hon. Shri. A. Y. Patil
(Founder,
SVSPM, Solankur

Hon. Shri. R. Y. Patil
Chairman,
SVSPM, Solankur)

Hon. Prof. S. A. Manjare
Principal,
YPSC, Solankur

Dr. S. V. Madhale
IQAC Co-ordinator
Head, Department of Botany

Registration Charges:

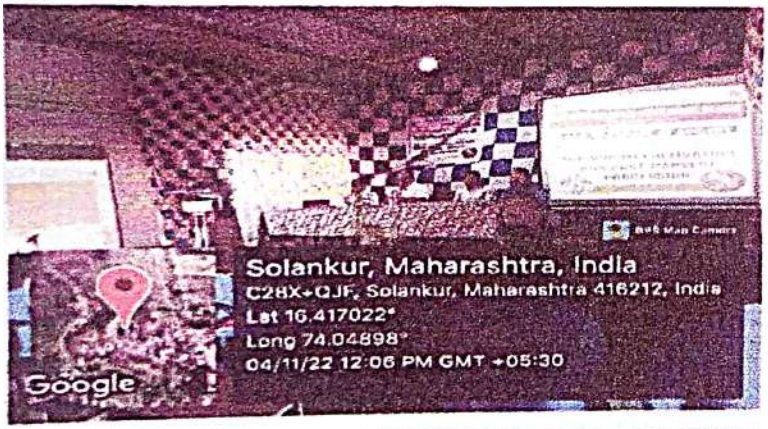
Online: Rs. 100 only

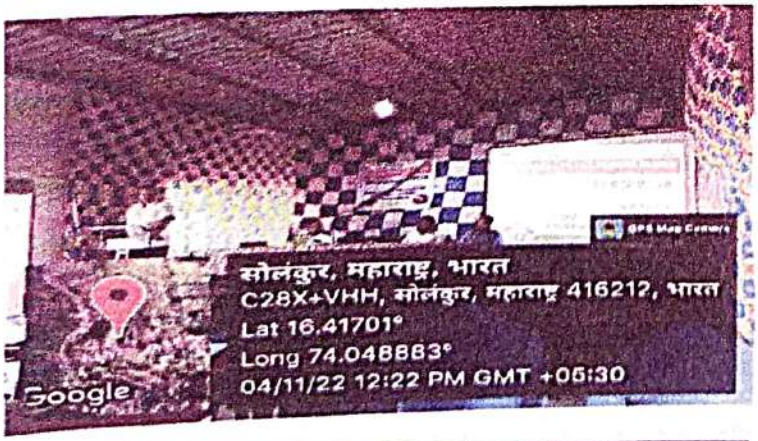
Offline: Rs. 150 Only

Account Details:

Account Holder: Dr. Santosh Vasant Madhale
Bank Name: Bank of Baroda
Bank Account Number: 20778100002852
IFSC: BARBOSOLANK (5th letter is zero)

Scan to Pay



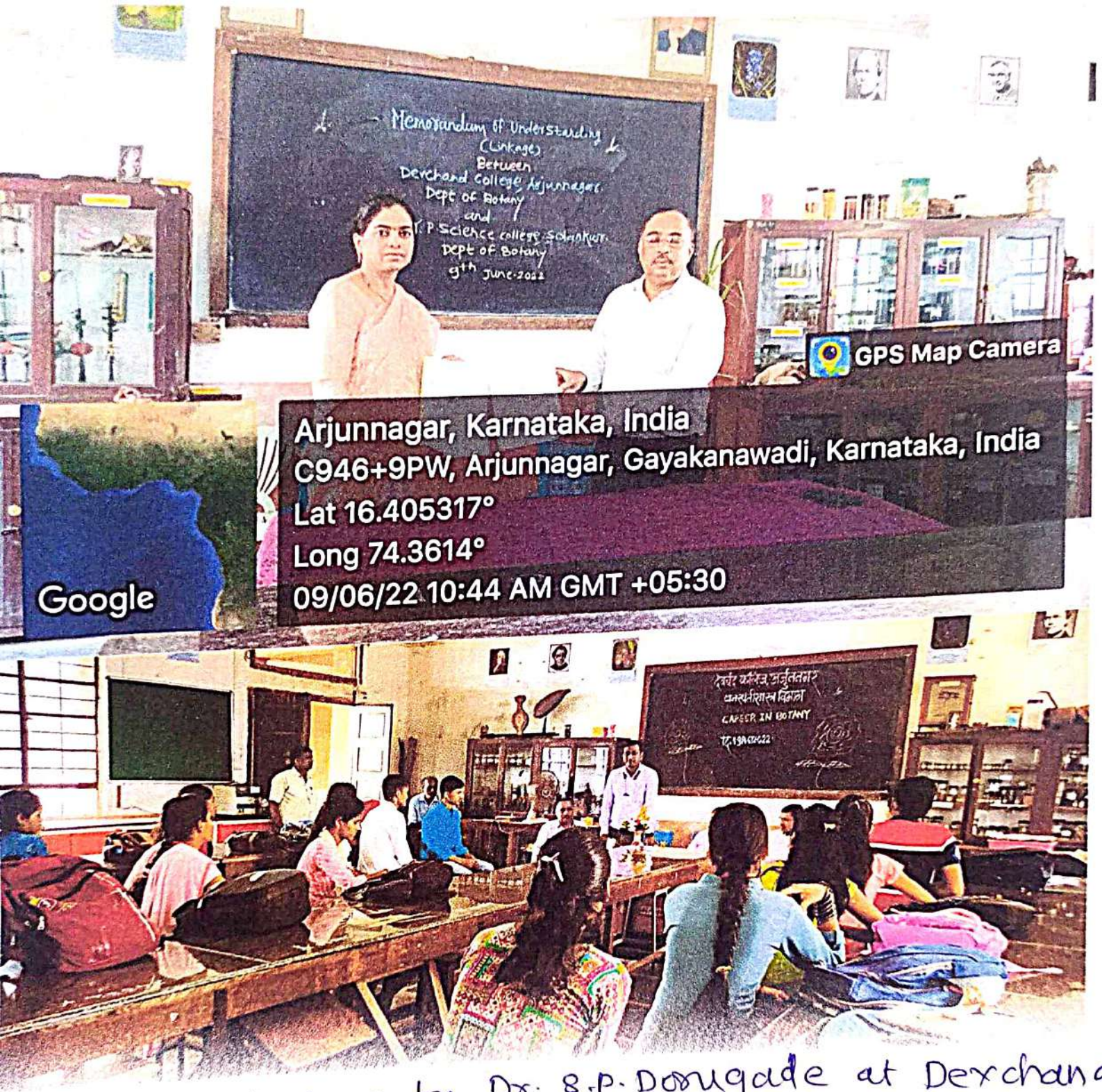


East.
Jun 2009

Guest Lecture by Dr. U. H. Patil (Career Opprtunities) and Dr. . R. G. Kamble (World Environment Day)

Guest Lecture by Shri. R.S. Bhosale (Plant Diversity)

Shri Yashwantrao Patil Science College
East.
Jun 2009
Dist.Kolhapur.
Solankur Tal Radhanagari



Guest lecture by Dr. S.P. Dongade at Derchand College, Arjunnagar.

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR

Activity Report

(Academic Year: 2020-2021)

Name of the activity	-	International Webinar
Name of the organizing department/ support service	-	Department of Botany, Y. P. S. College, Solankur.
Name of the Resource person(s)	-	Dr. Natthawad Dussadee, Vice President, Maejo University, Chiang Mai, Thailand. Prof. A. M. Deshmukh, President, Microbiologists Society, India, Ex-Professor & Head, Department of Microbiology, BAMU
Date	-	20/07/2021
Venue	-	
Number of beneficiaries	-	70
Aim	-	Immunity Boosting Herbal Medicines"
Outcome	-	

Yashwantrao Patil Science College Est. Jun 2009 Dist.Kolhapur

ISBN 978-81-926339-06

CONSERVATION OF WILD TAXA: PRESENT SCENARIO

EDITORS

DR. S. V. MADHALE
DR. S. P. DORUGADE
DR. M. V. GOKHALE
DR. M. S. SUTARE
DR. V. M. LAGADE
PROF. N. S. CHAVAN

Print ISSN: 0973-1431
Online ISSN: 0976-4755

BIOINFOLET

A Quarterly Journal of Life Sciences

UGC-CARE APPROVED JOURNAL, INDEXED IN WEB OF SCIENCE
CITATION INDEX, EXPANDED

Vol. 18 2021 No. 1B

THE RESEARCH PAPERS PUBLISHED IN THIS ISSUE WERE PRESENTED AT THE " INTERNATIONAL e-CONFERENCE ON CONSERVATION OF WILD TAXA : PRESENT SCENARIO (ICCWTPS 21) " HELD ON FEBRUARY 5, 2021 AT THE DEPARTMENT OF BOTANY, SHRI YESHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR, TEHSIL RADHANAGARI, DISTRICT KOLHAPUR, 416 212 (M. S.)

BIOINFOLET

Vol. 18 January - March 2021 No. 1 B

Life Science Informatics Publications

Research Journal of Life Sciences, Bioinformatics, Pharmaceutical and Chemical Sciences

Journal Home page http://www.rjlbpcs.com/

RJLBPCS

ISSN 2454-6348

Original Research Article

DOI: 10.26479/2022.0803.02

ETHNO BOTANICAL USES OF *LEEA MACROPHYLLA* ROXB. AND *LAGERSTROMIA PARVIFLORA* ROXB.

Manisha S Sutare[1*], Rajesh S Gaikwad[2]

1. Department of Botany, Shri Yashwantrao Patil Science College Solakur, Dist. Kolhapur, Maharashtra, India
2. Department of Botany, Swami Vivekanand Senior College Mantha, Dist. Jalna, Maharashtra, India.

ABSTRACT: *Leea macrophylla* Roxb. and *Lagerstromia parviflora* Roxb. are important traditionally used medicinal plants from ancient time period. In present work, medicinal significance and the pharmacological effects of the plant are discussed. It is essential to study the uses of plants and other associated knowledge which will help for researchers to introduce new phytoproducts for scientific validation. Besides, the present work suggests that the more scientific data is required to explore its chemical constituents in the treatment of diseases and disorders for making new therapeutic drugs. It is also suggested that both species are under threat of extinction so need to be protected.

Keywords: *Leea*, *Lagerstromia*, phytoproducts, medicinal plants, traditional medicine.

Article History: Received: May 24, 2022; Revised: June 06, 2022; Accepted: June 14, 2022.

Corresponding Author: Dr. Manisha S Sutare* Ph.D.

Department of Botany, Shri Yashwantrao Patil Science College Solakur, Dist. Kolhapur, Maharashtra, India. Email Address: drsutarems@gmail.com

1. INTRODUCTION

Western ghat within Maharashtra is a known to have good repository for plants that have preventive and curative effects on human health, thereby have been used as traditional medicine (TM) for different ailments since ancient times. TM is popular in parts of the African and Asian countries. According to World Health Organization (WHO), more than 80% of the world populations depend on TM for their primary health care needs. Plant-based medicinal systems continue to play an

II GYAN SEVA TYAG II

Shri Vyanknath Shikshan Prasarak Mandal's

SHRI YASHWANTRAO PATIL SCIENCE COLLEGE, SOLANKUR

Taluka: Radhanagari, District: Kolhapur (Maharashtra, India). Pincode: 416212

Email: ypvmsolankur@gmail.com / ypvms.436.cl@gmail.com

Website: www.ypsc.ac.in

Affiliated to Shivaji University Kolhapur, MS, India | Accredited by NAAC with 'B' Grade (CGPA=2.14)

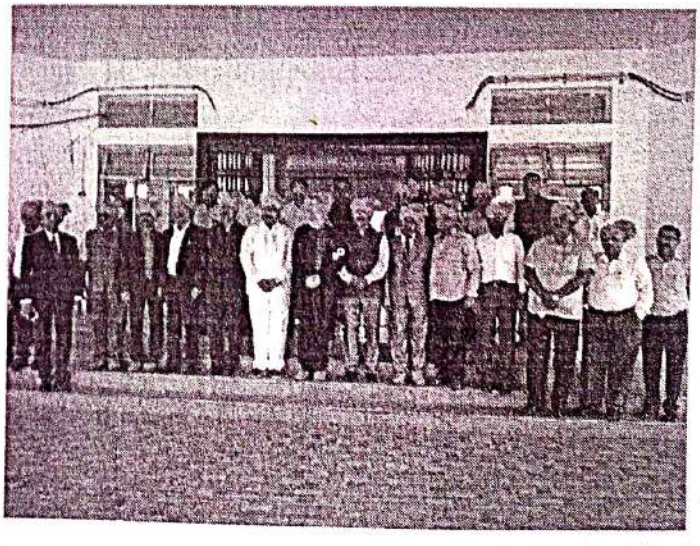
Shri. A. Y. Patil
Secretary

Shri. R. Y. Patil
Chairman

Activity Report – Conference / Seminar

(Academic Year: 2018-19)

Name of the activity	-	**Conference – 2nd ICMES-2018**
Organized by	-	Department of Physics, YPSC Solankur
Date of Activity	-	7th & 8th December 2018
Time	-	9 am onwards
Venue	-	Shivaji University Kolhapur auditorium
Total Number of participants	-	more than 100
Name of Faculty	-	Dr RB Patil, Dr SH Tamboli, Dr AA Jatratkar
Objective	-	conference
Outcome	-	recent advances in nanomayerials and technology, worked as Editor of special issue published in in Scopus indexed journal,



293(2023) 126964

Materials Chemistry and Physics xxx (xxxx) 126964

Contents lists available at ScienceDirect

Materials Chemistry and Physics

journal homepage: www.elsevier.com/locate/matchemphys

Development of magnetically recyclable nanocatalyst for enhanced Fenton and photo-Fenton degradation of MB and Cr(VI) photo-reduction

Rupali Chavan [a, b, 1], Nilesh Bhat [a, 1], Santosh Parit [b], Kitchamsetti Narasimharao [c], Rupesh S. Devan [c], Rahul B. Patil [d], Vijay C. Karade [e], Nilesh V. Pawar [f], Jin Hyeok Kim [e], Jyoti P. Jadhav [a, **], Ashok D. Chougale [b, *]

[a] Department of Biochemistry, Shivaji University Kolhapur, India
[b] Department of Chemistry, The New College Kolhapur, Shivaji University Kolhapur, India
[c] Department of Metallurgy Engineering and Materials Science, Indian Institute of Technology Indore, Simrol, Indore, 453552, India
[d] Department of Physics, Yashwantrao Patil Science College Solankur, Shivaji University Kolhapur, India
[e] Optoelectronic Convergence Research Center and Department of Materials Science and Engineering, Chonnam National University, South Korea
[f] Department of Botany, The New College Kolhapur, Shivaji University Kolhapur, India

ARTICLE INFO

Keywords:
Fenton
Photo-Fenton
Cr(VI) reduction
Dye degradation
Magnetic nanoparticles

ABSTRACT

The present work reports the facile green synthesis of Fe_3O_4 magnetic nanoparticles (MNPs) and their Fenton and photo-Fenton catalytic activity for reduction reactions. The glucose-mediated MNPs exhibit spherical morphology with an average diameter of 6.3 ± 1.1 nm. The catalytic activity of MNPs evaluated for Fenton and the photo-Fenton reactions resulted in 92 and 93% dye degradation in just 120 and 75 min, respectively. The magnificence of this novel synthesis methodology is the higher efficiency of both processes at varied pH ranges. Different catalytic parameters like wide pH range, catalyst dose, and H_2O_2 concentrations have made it more effective for both processes. Besides, the reusability study showed 63.71 and 57.57% activity even after six cycles in Fenton and photo-Fenton processes, respectively. The scavenger study showed the involvement of $\bullet OH_{ads}$ over $\bullet OH_{free}$ in the Fenton process, where •OH was found as a prime source of dye degradation in the photo-Fenton process. Moreover, Fe_3O_4 MNPs successfully reduced the 80 ppm load of Cr(VI) within 25 min, which improved further to 15 min by adding a chelating agent. This Fenton and photo-Fenton magnetically reusable catalyst will indulge the development of water treatment in an eco-friendly and economical way with great potential.

1. Introduction

The catastrophe of environmental pollution affects human health and has become a global concern. The leading source of pollution is the chemical products by industry or everyday products such as pesticides, coatings, printing inks, adhesives, cleaning agents, and personal care [1], which have become the greatest threat of pollution. Also growing industrial sector of textile, paper, and printing increases the threat of pollutants by its dyes and toxic heavy metals containing effluent. Worldwide over 7×10^5 tons of synthetic dyes are produced annually, whereas 2×10^5 tons of these dyes are lost to effluents annually during industrial operations [2]. Improper treatment of effluents that contain dyes causes water contamination, which is destructive to the environment. In recent years, nitrophenols and pigments used in pesticides, drugs, paper, plastic, paint, cosmetics, food, textiles, printing, and synthetic dyes, causing a considerable hazard towards environmental pollution [3]. These chemicals directly discharged in an open environment affect water, soil, plants, and animals.

Methylene blue (MB) is a heterocyclic aromatic compound known as methyl thioninium chloride, commonly used as a cationic dye. It also harms aquatic life by preventing its growth and regeneration [4]. Hence, it is necessary to remove the dyes from wastewater. Various technologies are developed to degrade or decolorize dyes, including physical, chemical, and biological approaches [5–9]. Some processes include filtration, reverse osmosis, electrochemical oxidation, activated carbon adsorption, coagulation, ion exchange, flocculation, ozonation, advanced oxidation, and the Fenton process for the decontamination of textile waste [10]. The advanced oxidation process (AOP) is one of the

* Corresponding author.
** Corresponding author.
E-mail addresses: jpj_biochem@unishivaji.ac.in (J.P. Jadhav), ashokdchougale@newcollege.ac.in, ashokdchougale@gmail.com
" style="font-size:9.6px;position:relative;font-style:normal;font-weight:400;text-transform:none;font-variant:none;text-indent:0px;">ashokdchougale@newcollege.ac.in, ashokdchougale@gmail.com (A.D. Chougale).
https://doi.org/10.1016/j.matchemphys.2022.126964
Received 31 August 2022; Received in revised form 22 October 2022; Accepted 27 October 2022
0254-0584/

On the shape based SPR of silver nanostructures

Rahul B. Patil*

Department of Physics,
Shri Yashwantrao Patil Science College, Solankur,
Shivaji University,
Kolhapur – 416211, India
Email: rrahulpatil@gmail.com
*Corresponding author

Ashok D. Chougale

Department of Chemistry,
The New College,
Shivaji University,
Kolhapur – 416012, India
Email: ashokdchougale@gmail.com

Abstract: Nanoscience and nanotechnology is the key towards enrichment of human life. It has been functional in almost all the sectors viz. energy, safety, medicine, biomedical, security, communication, space, health, agriculture, etc. The class of nanomaterials from 0D (dimensional) to 3D includes nanotubes, nanorods, nanoparticles (NPs), nanowires, nanoplates, nanodots (quantum dots), etc. Among the noble metals, silver nanomaterials have been of great interest since ancient times. It is being used in different fields such as textile industry, food packaging, cosmetic industry, catalysis, various bio applications, coatings, DNA sequencing, SERS, etc. The last decade has concentrated on its antibacterial potential and its use in nano-bio-applications. The interesting optical properties specifically surface plasmon resonance (SPR) have been studied widely to explore its practical application in sensors, bio-devices, data storage, spectroscopic techniques, catalysis etc. It can be tuned by varying size and shape of NPs. Along with this SPR is the prime easy tool to get the prima-facie information about size and shape of the synthesised nanomaterials. This paper aims to focus on shape based SPR of silver nanostructures.

Keywords: silver; AgNPs; nanostructure; nanotechnology; SPR; surface plasmon resonance.

Reference to this paper should be made as follows: Patil, R.B. and Chougale, A.D. (2021) 'On the shape based SPR of silver nanostructures', *Int. J. Nanotechnol.*, Vol. 18, Nos. 11/12, pp.1015–1027.

Biographical notes: Rahul B. Patil is working as Head of the Department of Physics, YP Science College, Solankur. He is IQAC coordinator. He received his PhD in Physics from Shivaji University, Kolhapur in 2008. His research area is thin film and currently working in field of nanomaterials. He has 22 research papers in Scopus indexed journals. He has been Postdoctoral Fellow at National Central University, Taiwan.

47(16) (2021) 5520-32

Materials Today: Proceedings xxx (xxxx) xxx

Contents lists available at ScienceDirect

Materials Today: Proceedings

journal homepage: www.elsevier.com/locate/matpr

Analytical methods for the identification and characterization of silver nanoparticles: A brief review

Rahul B. Patil [a,*], Ashok D. Chougale [b,*]

[a] Shri Yashwantrao Patil Science College, Solankur, Shivaji University, Kolhapur, India
[b] The New College, Kolhapur, Shivaji University, Kolhapur, India

ARTICLE INFO

Article history:
Available online xxxx

Keywords:
Silver nanoparticles
XRD
XPS
DLS
TEM
FTIR

ABSTRACT

Bionanotechnology is one of centered subdisciplines inside nanotechnology. Since antiquated occasions, silver nanoparticles (AgNPs) are being utilized for an assortment of uses. Numerous combination techniques are developed under the top-down and bottom- up methodology. The precise particle characterization is essential after synthesis since the properties of a particle could significantly affect its physico-chemical and biological properties. The trademark highlight of nanomaterials, for example, size, shape, size dispersion, surface zone, shape, solvency, aggregation etc. should be assessed before surveying poisonousness or biocompatibility. The evaluation of the synthesized nanomaterials are done using many analytical techniques such as XRD, UV–vis spectroscopy, DLS, FTIR, XPS, SEM, AFM, TEM and so on. Here, key techniques are described along with a few examples in accordance with recent studies on AgNPs.

Selection and peer-review under responsibility of the scientific committee of the 3rd International e-Conference on Frontiers in Mechanical Engineering and nanoTechnology.

1. Introduction

The noble metals especially silver nanoparticles (AgNPs) are being used since ancient times for various applications. Inferable from their interesting properties, for example, high surface-to-volume proportion, broad size shape, and compositional tunability, agreeability to recuperation, they are generally utilized in the biomedical field and catalysis. The huge advancements in the field of nanoscience have driven and boosted the field of nanotechnology. Looking at the recent pandemic situation due to COVID-19, the various research organizations with the help of governments and industries invented vaccines that arrived in a historically short period. Nano-based materials have played a crucial role in diagnosis and treatment. The viability of nanomaterials relies upon different boundaries dependent on the specific application. The different combination strategies have developed under top-down and bottom- up methodologies. Every technique has its disadvantages and preferences. Tuning the property of nanomaterials concerning shape and size has likely used in nanotechnology. The nanomaterials exist in different structures, for example, nanocubes, nanowires, nanoparticles (NPs), nanoplates, nanoprisms, nanorods, nanotubes, and so on. The usefulness of nanomaterials with a particular size and shape becomes important for the particular application. In this context, analytical techniques play a crucial role. The fundamentals of the analytical techniques along with insights into AgNPs are discussed with recent examples.

2. Analytical techniques for characterization of AgNPs:

2.1. X-ray diffraction

X-ray diffraction (XRD) is a non-destructive technique and one of the essential scientific strategies which have been utilized to investigate the molecular and crystal structures along with qualitative identification of various compounds, quantitative resolution of chemical species, estimating the level of crystallinity, isomorphous substitutions, particle sizes etc. Analysis of the materials to a great extent relies upon the arrangement of a diffraction pattern. The working principle of XRD is Bragg's law and is based on the wide-angle elastic scattering of X-rays. When the crystal is exposed to X-rays, it forms several diffraction patterns. These patterns replicate the physico-chemical characteristics of the materials crystal structures. In a powder specimen, diffracted beams

* Corresponding authors.
E-mail addresses: rrahulpatil@gmail.com (R.B. Patil), ashokdchougale@gmail.com (A.D. Chougale).

https://doi.org/10.1016/j.matpr.2021.03.384
2214-7853/
Selection and peer-review under responsibility of the scientific committee of the 3rd International e-Conference on Frontiers in Mechanical Engineering and nanoTechnology.