



## New triazole-based Schiff base ligands and their Co(II) and Ni(II) complexes as biological potent molecules: Chemical preparation, structural elucidation and biological studies

Pratibha C. Dhale<sup>a</sup>, Panchsheela A. Ubale<sup>b,\*</sup>, Kailas D. Sonawane<sup>c</sup>, Nitin M. Naik<sup>d</sup>, Mohd Afzal<sup>e</sup>, Lahu A. Ghule<sup>f</sup>, Sachin A. Deodware<sup>a</sup>, Kundalkesha D. Gaikwad<sup>a</sup>, Umesh B. Barache<sup>a</sup>, Shashikant H. Gaikwad<sup>b</sup>

<sup>a</sup> Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi 413 401, Maharashtra, India

<sup>b</sup> Department of Chemistry, N.K. Orchid College of Engineering and Technology, Solapur 413 001, Maharashtra, India

<sup>c</sup> Department of Biochemistry, Structural Bioinformatics Unit, Shivaji University, Kolhapur 416 004, Maharashtra, India

<sup>d</sup> Department of Microbiology, Shivaji University, Kolhapur 416 004, Maharashtra, India

<sup>e</sup> Department of Chemistry, College of Science, King Saud University, Riyadh 11451, Saudi Arabia

<sup>f</sup> Department of Chemistry, R.D. and S.H. National College and S.W.A. of Science College, Bandra (W), Mumbai 400050, Maharashtra, India

### ARTICLE INFO

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Metal complexes  
Molecular docking  
Antioxidant  
Anticancer activity

### ABSTRACT

Preparation of sequence of Co(II) and Ni(II) metal complexes (C1a - C3a and C1b - C3b) of bidentate ligands (L1 - L3) has been resulted from the condensation of substituted 1,2,4-triazole with various substituted 1,3-diphenyl-1H-pyrazole-4-carbaldehyde are described in the present study. The structures of synthesized complexes were established by elemental investigation, IR, mass spectroscopy and TGA examinations. The data confirmed that bonding through the nitrogen atom from imine group and sulfur atom of triazole, ligand get integrated with the metal ions in a bidentate nature, gave an octahedral geometry to the complexes. The antibacterial activities have been tested against *S. aureus* Gram-positive bacteria and *E. coli* Gram-negative bacteria. Further, through DPPH radical scavenging capacity assay the antioxidant activity values were quantified; all the compounds demonstrate outstanding antioxidant activities. Using molecular docking and highest binding affinities for biological targets, the ligand and complex interactions have been studied. The *in vitro* anti-proliferative nature of synthesized ligands and their Ni(II) and Co(II) complexes were appraised with the help of SRB assay against Human hepato carcinoma cell (Hep-G2), Lung cells (A-549), Breast cell (MCF-7), Prostate cell (PC-3). Anti-tubercular studies revealed that the complex demonstrates a greater anti-tubercular activity than the analogous ligands.

### Introduction

One of the greatest medical challenges facing research scientists in the 21st century is to find a cure for cancer in human beings, however drugs (cisplatin, oxaliplatin, carboplatin) used in cancer treatments include many side effects. Therefore, finding cancer treatment method that can minimize the side effects is a hot topic of current research. Recently, the study related with metal comprising drugs, displays auspicious biological activities [1]. To replace drugs with the first row transition metals like copper, zinc, cobalt and nickel are the most evaluated category due to their coherence and endogenous presence in the life system as cofactors in several enzymes [2]. Nowadays,

heterocyclic chemistry has become a separate field of chemistry for present society and for prospects in scientific field, as nitrogen, oxygen, and sulphur are the most well-known hetero atoms with significant role in biological systems. Due to implications in drugs and industrial studies, heterocyclic compounds are considered as one of the important classes of organic compounds [3,4]. The most important type of heterocyclic compound is a five membered triazole with three nitrogen atoms and two carbon atoms [5]. The three nitrogen atoms from triazole, procedures polar and non-polar interactions with diverse key residues in the receptor-ligand binding procedure, and are widely useful in the molecular design in the growth of anti-AD (Alzheimer's disease) agents [6]. Amine and thione-substituted triazole have been studied as

\* Corresponding authors.

E-mail addresses: [panchsheela\\_ubale@rediffmail.com](mailto:panchsheela_ubale@rediffmail.com) (P.A. Ubale), [rasiyanshg@gmail.com](mailto:rasiyanshg@gmail.com) (S.H. Gaikwad).

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## CERTIFICATE

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This is to certify **Miss. Pratiksha Maruti Narvade** has satisfactorily completed an "Industrial Training"(OJT) in **yogesh Industries Motirich Aqua , Barshi** From 7<sup>th</sup> Feb 2024 to 4 Mar 2024 which is being submitted here with as a partial fulfillment for the award of degree of Master of Science in Organic Chemistry.

Place: Barshi

Date:

  
Project Guide

Ass. Prof. Dr. U. B. Barache

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Department of Chemistry,

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Project Guide

Ass. Prof. Dr. U. B. Barache

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Students worked at Yogesh Industries Motirich aqua, Barshi





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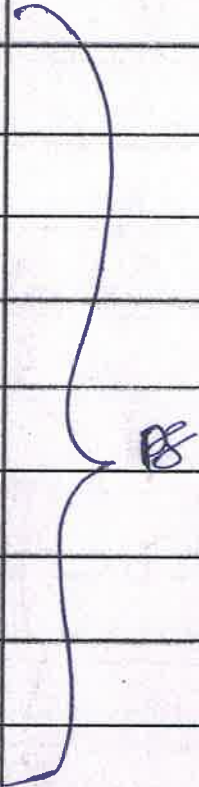
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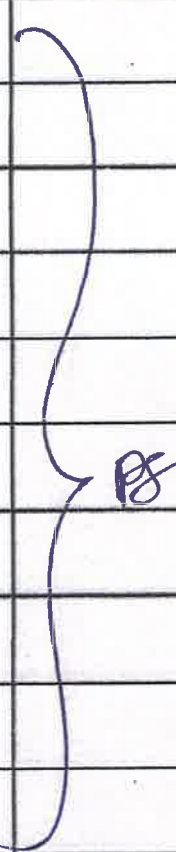
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## MoU with Bhoomi Vermi Project



## Installation of Vermicomposting bed at Shri Shivaji Mahavidyalaya Barshi





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Date:



  
**Anand R. Bedmutha (CEO)**



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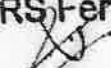
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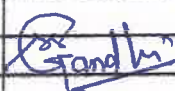
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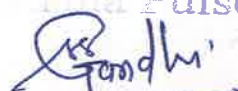
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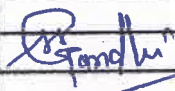
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Email: [darshanasolventexpvtltd@gmail.com](mailto:darshanasolventexpvtltd@gmail.com)

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This is to certify that **Miss. Jadhav Swati Bhagvan M.Sc. I Analytical Chemistry** student of **Shri Shivaji Mahavidyalaya Barshi**, has successfully completed on Job Training from 16<sup>th</sup> April 2024 to 6<sup>th</sup> May 2024 at our organization.

During the period of her on job training with us she was found punctual, hardworking and inquisitive. We wish her every success in life.

For, Darshana Solvent Extraction Pvt. Ltd.

**Mr. Shital Gandhi**

Director





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A handwritten signature in blue ink, appearing to read "S. S. Jadhav".



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For, Darshana Pulses Barshi Pvt. Ltd.

**Mr. Shital Gandhi**

Managing director



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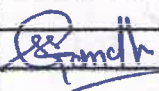
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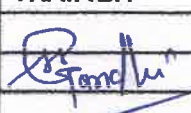
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ON JOB TRAINING

Name of Institute - Darshana Solvent Extraction Pvt. Ltd

Name of Student - Kale Sudarshan Sunil

SR NO.	DATE	PRESENTY	SIGN OF INSTITUTE TRAINER
1	28-04-24	P	
2	29-04-24	P	
3	30-04-24	P	
4	01-04-24	P	
5	02-04-24	P	
6	03-04-24	P	
7	04-04-24	P	
8	05-04-24	P	
9	05-04-24	P	
10	06-04-24	P	

Darshana Pulses  
  
Proprietor  
Institute in charge



Factory: Gat No. 110/B, Barshi-Tuljapur Road, Kadam Vasti, Barshi-413-401

Office: Plot No. 90/91, Market Yard, A/p- Barshi 413 401, Dist-Solapur

Email: darshanasolventexpvtltd@gmail.com

CIN NO.001100PN2021PTC202411, GST NO.27AAICD5981C1ZJ

## CERTIFICATE

This is to certify that **Mr. Ghodke Kunal Mahadev** M.Sc. I Analytical Chemistry student of **Shri Shivaji Mahavidyalaya Barshi**, has successfully completed on Job Training from 16<sup>th</sup> April 2024 to 6<sup>th</sup> May 2024 at our organization.

During the period of him on job training with us he was found punctual, hardworking and inquisitive. We wish his every success in life.

For, Darshana Pulses Barshi Pvt. Ltd.

**Mr. Shital Gandhi**

Managing director





# ANEKANT AUTOMATIC SYSTEM

439, Kasarda Galli, Kasba Peth, Barshi,  
Dist. Solapur, Maharashtra. 413411.  
GSTN - 27BK NPD 9774 Q1Z1

UAM NO - MH12A0018112  
Contact : 9420782665, 7058698432  
Email : anekantsys101@gmail.com  
www.anekantsys.in

Job No - ISAP2415

Pages - 1/1

Date - 15/04/2024

## On the job training certificate

Issued on: 15/04/2024

Exam No: 344198

This is to certify that Ms. / Mr. Karande Snehal Shrikant. D/o, Karande Shrikant Nanasaheb, has successfully completed On the Job Training Course with Grade B for M.Sc I Electronics (Internet of Things) conducted by Anekant Automatic System, Barshi facilitated by Department of Electronics, Shri Shivaji Mahavidyalaya, Barshi. From 01/04/2024 To 15/04/2024 at Anekant Automatic System, 439, Kasar Galli, Barshi-413401.

Grading for performance are as follows:

Grade A - Outstanding

Grade B - Very good

Grade C - Good

Grade D - Average

Anekant Automatic System

V. K.   
Proprietor



# ANEKANT AUTOMATIC SYSTEM

439, Kasarda Galli, Kasba Peth, Barshi,  
Dist. Solapur, Maharashtra, 413411.  
GSTN - 27BK NPD 9774 Q121

UAM NO - M0132M0018112  
Contact : 9420782665, 7058698432  
Email : anekantsys101@gmail.com  
www.anekantsys.in

Leter No. - 15AP2417

Pages - 1/1

Date - 15/04/2024

## On the job training certificate

Issued on: 15/04/2024

Exam No: 344200

This is to certify that Ms. / Mr Mulla Furkhan Rafik , S/o Mulla Rafik Dastagir has successfully completed On the Job Training Course with Grade B for M.Sc I Electronics (Internet of Things) conducted by Anekant Automatic System, Barshi facilitated by Department of Electronics ,Shri Shivaji Mahavidyalaya ,Barshi. From 01/04/2024. To 15/04/2024 at Anekant Automatic System , 439,Kasargalli ,Barshi-413401.

Grading for performance are as follows:

Grade A - Outstanding

Grade B - Very good

Grade C - Good

Grade D - Average

Anekant Automatic System

V.k.   
Proprietor





# ANEKANT AUTOMATIC SYSTEM

439, Kasarda Galli, Kasba Peth, Barshi, - Contact : 9420782665, 7058698432  
Dist. Solapur, Maharashtra, 413411. Email : anekantsys101@gmail.com  
GSTN - 27BK NPD 9774 Q1Z1 www.anekantsys.in

Letter No - 15AP2418

Pages - 1/1

Date - 15/04/2024

## On the job training certificate

Issued on 15/04/2024

Exam No: 344201

This is to certify that Ms. / Mr.. Pandharmise Anjali Sanjay.D/o, S/o...  
Pandharmise Sanjay Namdev. has successfully completed On the Job Training  
Course with Grade B for M.Sc I Electronics (Internet of Things) conducted by  
Anekant Automatic System, Barshi facilitated by Department of Electronics  
,Shri Shivali Mahavidyalaya ,Barshi. From 01/04/2024. To 15/04/2024 at  
Anekant Automatic System , 439,Kasargalli ,Barshi-413401.

Grading for performance are as follows:

Grade A - Outstanding

Grade B - Very good

Grade C - Good

Grade D - Average

**Anekant Automatic System**

*V. K. Prasad*  
**Proprietor**

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शिक्षणशास्त्र महाविद्यालयात माजी विद्यार्थी ऑनलाईन मेळावा



BREAKING NEWS

प्रमुख पाहुणे तथा साधन व्यक्ती डॉ.व्ही. एम .गुरमे

1:30 / 8:11

शिक्षणशास्त्र महाविद्यालयात 438 माजी विद्यार्थ्यांचा ऑनलाईन मेळावा



Programme on stress management organized by NSS & Department of Psychology  
Shri Shivaji Mahavidyalaya, Barshi at Kandalgaon by Ayush Institute of Adiction  
Management, Jamgaon



Guest lecture of Dr Tambare on stress management organized by NSS & Department  
of Psychology Shri Shivaji Mahavidyalaya, Barshi





**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**  
( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH - India

**Prin. Dr. A. B. Shaikh**  
M. Sc., Ph. D.



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : ssmbarshi@rediffmail.com

Ref. No.

Date : 15.01.2023

To,  
**Medical Officer,**  
**Dr. Yadav Hospital, Barshi**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Bhosale Amar Maruti 2. Choure Dinesh Mahadeo 3. Choudhari Rohan Govind 4. Bagal Pratiksha Nagnath 5. Bhagwan Anjum Riyaj students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 18.01.2023 to 18.02.2023.

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**PRINCIPAL**  
**Shri Shivaji Mahavidyalaya**  
**Barshi, Dist. Solapur**



# Dr. YADAV HOSPITAL

Baleshwar Naka, Barshi - 413401. (Dist. Solapur) ☎ 222760

**Dr.B.Y.Yadav**

M.S.

Reg. No. 27191

**Dr.Mrs.M.B.Yadav**

M.B.B.S.

Reg. No. 32623

Date 

## Training Completion Certificate

This is to certify that 1. Bhosale Amar Maruti 2. Choure Dinesh Mahadev 3. Chudhari Rohan Govind 4. Bagal Pratiksha Nagnath 5. Bagwan Anjum Riyaj students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Dr. Yadav Hospital, Barshi**, from 18.01.2023 to 18.02.2023.

As per our measurements and reporting structure, they are hardworking and have been excellent during the onjob training.

  
**D.R. B. Y. YADAV**  
M.S.  
Reg. No. 27191  
YADAV HOSPITAL, BARSHI



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## Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy

journal homepage: [www.elsevier.com/locate/saa](http://www.elsevier.com/locate/saa)

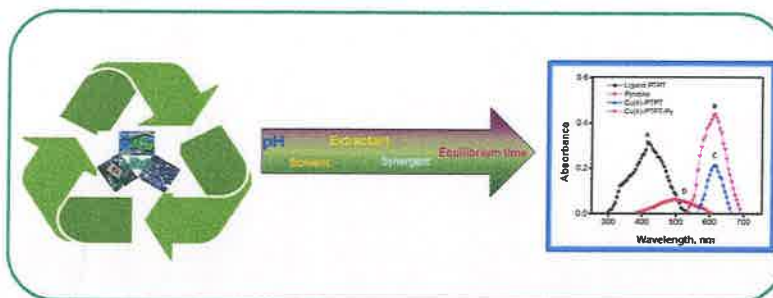
## Design and optimization of sensitive analytical spectrophotometric method for micro determination of copper(II) from e-waste by using of novel chromogenic extractant

Sangram B. Kharade<sup>a,h</sup>, Rajvardhan K. Chougale<sup>a</sup>, Umesh B. Barache<sup>b</sup>, Kallappa R. Sanadi<sup>c</sup>, Kishan C. Rathod<sup>d</sup>, Shashikant H. Gaikwad<sup>e</sup>, Yong-Chuin Ling<sup>f</sup>, Mansing A. Anuse<sup>g</sup>, Ganesh S. Kamble<sup>a,h,\*</sup><sup>a</sup> Department of Engineering Chemistry, Kolhapur Institute of Technology's College of Engineering (Autonomous), Kolhapur, Affiliated to Shivaji University, Kolhapur 416234, India<sup>b</sup> School of Chemical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur 413225, India<sup>c</sup> Department of Chemistry, Doodhsakhar Mahavidyalaya, Bidri, Kolhapur 416208, India<sup>d</sup> Department of Chemistry, The New College, Kolhapur 416012, India<sup>e</sup> Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi 413411, India<sup>f</sup> Department of Chemistry, National Tsing Hua University, Hsinchu 300, Taiwan<sup>g</sup> Department of Chemistry, Shivaji University, Kolhapur 416004, India<sup>h</sup> Shri Jagdishprasad Jhabarmal Tibrewala University, Vidyanagari, Rajasthan 333001, India

## HIGHLIGHTS

- Easy synthesis of chromogenic ligand.
- The method has to be showed the synergistic effect on extraction and spectrophotometric determination of copper(II).
- Dilute pyridine used as an auxiliary extractant.
- Successfully applied for real sample analysis.
- The developed method is reliable for determination of copper(II) from e-waste.

## GRAPHICAL ABSTRACT



## ARTICLE INFO

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PTPT

Pyridine

Spectrophotometry

Liquid-liquid extraction

## ABSTRACT

In this article, a novel spectrophotometric reagent 1-(pyrimidine)-4, 4, 6-trimethyl-1,4-dihydropyrimidine-2-thiol [PTPT] has been synthesized for liquid-liquid extraction and spectrophotometric determination of copper(II). The as-synthesized ligand has been selectively forms stable complex with copper(II) in basic medium (pH 9.0), in presence of mild pyridine the extraction and color stability has found to be synergistically enhanced. The equilibrium time is 10 min for effective extraction of copper(II) from organic phase and absorbance of colored organic complex in carbon tetrachloride is measured spectrophotometrically at  $\lambda_{max}$  615 nm against reagent blank. The ternary complex of Cu(II)-PTPT-Py having molar ratio 1:2:2 (M:L:Py) showed green colored complex. The main factors influencing the achievement of synergistic extraction; i.e. pH, ligand concentration, type and volume of the dispersive organic solvents, equilibrium time, synergent concentration and foreign ions were investigated.

The Beer's law was obeyed in the concentration range 1–20  $\mu\text{g mL}^{-1}$  of copper(II) and optimum concentration range is evaluated by Ringbom's plot and it is found that 2.5–25  $\mu\text{g mL}^{-1}$ . In presence of pyridine, molar absorptivity and Sandell's sensitivity of copper(II)-PTPT complex is  $2.80 \times 10^3 \text{ L mol}^{-1} \text{ cm}^{-1}$  and  $0.226 \mu\text{g cm}^{-2}$ , respectively and in absence of pyridine, molar absorptivity and Sandell's sensitivity of

Abbreviations: P1P1, 1-(pyrimidine)-4, 4, 6-trimethyl-1,4-dihydropyrimidine-2-thiol; PAR, 4-(2-Pyridylazo) resorcinol; Py, Pyridine; Sy, Synergent.

\* Corresponding author at: Department of Engineering Chemistry, Kolhapur Institute of Technology's College of Engineering (Autonomous), Kolhapur, Affiliated to Shivaji University, Kolhapur 416234, India, Shri Jagdishprasad Jhabarmal Tibrewala University, Vidyanagari, Rajasthan 333001, India.

✉ [ganeshchemistry2010@gmail.com](mailto:ganeshchemistry2010@gmail.com) (G.S. Kamble).

<https://doi.org/10.1016/j.saa.2021.120502>

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Dist. - Solapur, MH - India

**I/c Prin. Dr. Bharati Revadkar**  
**M.A.,M.Phil.,M.Ed.,NET.,Ph.D.**



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : ssmbarshi@rediffmail.com

Ref. No.

Date : 28.09.2022

To,  
**Hon. Secretary,**  
**Atul Feed, Barshi**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending 1. Kashid Shivratan Rajshekhar 2. Ghodke Kunal Mahadeo 3. Gade Krushna Manik 4. Kale Sudarshan Suresh students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 02.10.2022 to 02.11.2022.

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**I/C. PRINCIPAL**  
Shri Shivaji Mahavidyalaya, Barshi

# Atul Feeds

Manufacturer of Tamarind Kernel Powder

Office : 3874, Solapur Road, BARSHI - 413401. Dist. Solapur (M.S.) India  
☎: +91-2184-222606, 222056, Fax : 227567 Mo. 9422068606 email: atulsonigra@gmail.com

Date :

## Training Completion Certificate

This is to certify that 1. Kashid Shivratn Rajshekhar  
2. Ghodke Kunal Mahadeo 3. Gade Krushna Manik 4. Kale  
Sudarshan Suresh students of Shri Shivaji Mahavidyalaya,  
Barshi has successfully completed On Job training for a period  
of 30 days with **ATUL FEEDS, Barshi**, from 02.10.2022 to  
02.11.2022.

As per our measurements and reporting structure, they  
are hardworking and have been excellent during the on job  
training.

Atul Feeds

  
Proprietor

Atul Feeds

Get No.-109/2, Kadam Vasti,  
Tuljapur Road Barshi-413401

Factory : 109/2, Near Kadam Vasti, Tuljapur Road, Barshi - 413401. Dist. Solapur (M.S.)



Students participating in Field work at Atul Feeds Barshi





**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**  
( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH - India

**I/c Prin. Dr. Bharati Revadkar**  
**M.A.,M.Phil.,M.Ed.,NET.,Ph.D.**



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : [ssmbarshi@rediffmail.com](mailto:ssmbarshi@rediffmail.com)

Ref. No.

Date : 01.01.2022

To,

**Medical Officer,**  
**Karmaveer Dr Mamasahab Jagdale Hospital Barshi,**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Mali Vinod Gorakh  
2. Khote Abhishek Dipak 3. Deshmukh Akshata Sanjay 4. Kolekar Laxmi D. 5. Bairagi  
Onkar K. students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed  
laboratory during 02.01.2022 to 02.02.2022.

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**I/C, PRINCIPAL**  
**Shri Shivaji Mahavidyalaya, Barshi**

॥ एकमेका साह्य करु। अवघे धरु सुपंथ ॥  
श्री शिवाजी शिक्षण प्रसारक मंडळ, बारशी संचालित



## जगदाळे मामा हॉस्पिटल, बारशी.

शिवाजी नगर, 413411. जि. सोलापूर. फोन : 02184-229963, 229964 मो. 880-628-6565/6767  
email : jmhbarshi@yahoo.in, jmhbarshi@gmail.com



जावक क्रमांक

दिनांक : / /

### Training Completion Certificate

This is to certify that 1. Mali Vinod Gorakh 2. Khote Abhishek Dipak 3. Deshmukh Akshata Sanjay 4. Kolekar Laxmi D. 5. Bairagi Onkar K. Soudagar students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Jagdale Mama Hospital, Barshi**, from 02.01.2022 to 02.02.2022.

As per our measurements and reporting structure, they are hardworking and have been excellent during the onjob training.

  
**Medical Superintendent  
Jagdale Mama Hospital, Barshi.**

## MoU with Jagdale Mama Hospital Barshi and Pathology Lab



## Students' communication with diabetic patient of Dr. Jagdale mama Hospital





Students project work at Pathology Lab in Dr. Jagdale Mama Hospital



Students participating in Field work at to Blood bank



## MoU with Warana Dairy and Agro industry

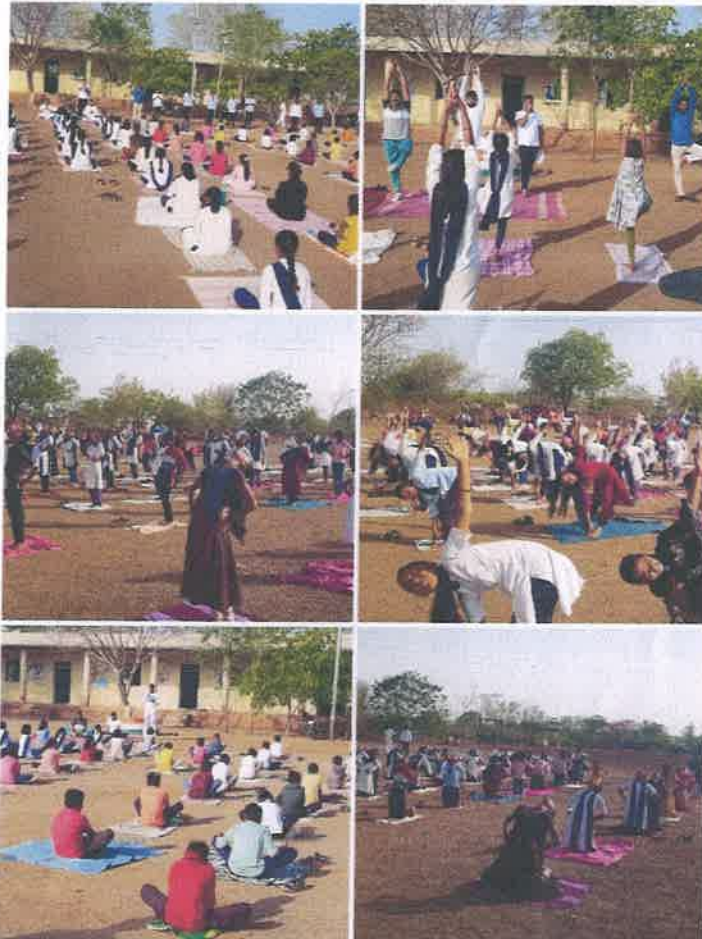


## Students project work at Warana Dairy and Agro products





Yoga Shibir in collaboration with Ambika Yog kutir, Barshi





## Training of Student at SIILC, Pune





**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**

( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH - India

**I/c Prin. Dr. Bharati Revadkar**

**M.A.,M.Phil.,M.Ed.,NET.,Ph.D.**



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : [ssmbarshi@rediffmail.com](mailto:ssmbarshi@rediffmail.com)

Ref. No.

Date : 8-10-22

To,

**Medical Officer,**  
**Dr. Jadhavar Hospital Barshi,**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Kharat Nikita Tatyta 2. Pawar Tejswini Namdeo 3. Depram Priyanka B. 4. Pisal Siddhanth H. 5. Waghmare Rohit S. students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 10.10.2022 to 10.11.2022

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**I/C. PRINCIPAL**  
Shri Shivaji Mahavidyalaya, Barshi

॥ श्री दत्तकृपा ॥  
**जाधवर हॉस्पिटल**  
पत्ता : उपळाई रोड, अंकुश रिहास्टॉपजवळ, सोलापूर जनता बँकजवळ, बारशी.  
मो. ८२७५३०४५२४ वेळ : सकाळी ९.३० ते २.०० सायं. ५.०० ते १०.०० वाजेपर्यंत  
लहान मुलांना वाफ देणे व सर्व प्रकारच्या लसींची सोय, तसेच रक्त व लघवी तपासणी केली जाईल.

नांव \_\_\_\_\_ दि. / / २०२

*Rc*

## Training Completion Certificate

This is to certify that 1. Kharat Nikita Taty 2. Pawar Tejswini Namdeo 3. Depram Priyanka B. 4. Pisal Siddhanth H. 5. Waghmare Rohit S. students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Dr. Jadhvar Hospital, Barshi**, from 10.10.2022 to 10.11.2022

**JADHAWAR HOSPITAL**  
Reg.No. 177  
वरील सर्वप्रकारची प्रीत्ये खालील पत्त्यावरील मुकांनार्त मिळतील.  
अभिषेक मेडिकल अँड जनरल डो अर्स - ४२८५०५१०६५५  
जाधवर हॉस्पिटलचे समोरील बाजूस, उपळाई रोड, अंकुश रिहास्टॉपजवळ, बारशी.  
\* विशेष सेवा : डायबेटीस व ब्लडप्रेसरच्या ग्राहकांना औषधे घरपोष दिली जातील. \*

*[Signature]*

**+**



**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**  
( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH - India

**I/c Prin. Dr. Bharati Revadkar**  
**M.A.,M.Phil.,M.Ed.,NET.,Ph.D.**



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : [ssmbarshi@rediffmail.com](mailto:ssmbarshi@rediffmail.com)

Ref. No.

Date :

To,  
**Medical Officer,**  
**Kothari Laboratory, Barshi**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Takbhate Ashwini  
B. 2. Chougule Malkari H. 3. Karande Onkar Mangesh 4. Parade Sonal D. students of Shri  
Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during  
02.07.2022 to 02.08.2022

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**I/C. PRINCIPAL**  
**Shri Shivaji Mahavidyalaya, Barshi**





**KOTHARI  
LABORATORY**

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Patel Chowk, Barshi - 413 401 ☎ 02184 - 223316, 8421 340 386
  - Mahavir Tower, Subhash Nagar, Aagalgaon Road, Barshi  
☎ 94226 81790
- E-mail: kotharilabbarshi@gmail.com

## Training Completion Certificate

This is to certify that 1. Takbhate Ashiwini B. 2. Chougule Malkari H. 3. Karande Onkar Mangesh 4. Parade Sonali D. students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Kothari Laboratory, Barshi**, from 02.07.2022 to 02.08.2022.

As per our measurements and reporting structure, they are hard working and have been excellent during the on job training.

  
**कोठारी लॅबोरेटरी**  
बार्शी-४१३ ४०१  
☎ 02184 223316  
Mob No. 08421340386



## Chemical synthesis, spectral characterization and biological activities of new diphenylsulphone derived Schiff base ligand and their Ni(II) complexes

Kundalkesha D. Gaikwad<sup>a</sup>, Rahul M. Khobragade<sup>b</sup>, Sachin A. Deodware<sup>a</sup>, Panchsheela A. Ubale<sup>c</sup>, Pratibha C. Dhale<sup>a</sup>, Rekha M. Ovhal<sup>d</sup>, Chandan Shivamallu<sup>e</sup>, Veena Malligere Ankegowda<sup>f</sup>, H.L. Raghavendra<sup>g</sup>, Shashikant H. Gaikwad<sup>a,\*</sup>, Shiva Prasad Kollur<sup>h,\*</sup>

<sup>a</sup> Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi, Solapur 413 411, Maharashtra, India

<sup>b</sup> Department of Microbiology, Dr. Babasaheb Ambedkar Marathwada University, Sub Campus, Osmanabad 413501, Maharashtra, India

<sup>c</sup> N.K. Orchid College of Engineering and Technology, Solapur 413002, Maharashtra, India

<sup>d</sup> Department of Chemistry, Walchand College of Art, Science and Commerce, Solapur 413 006, Maharashtra, India

<sup>e</sup> Department of Biotechnology and Bioinformatics, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru, Karnataka 570 015, India

<sup>f</sup> Department in Chemistry, Bangalore Institute of Technology, K.R. Road, VV Puram, Bangalore 560 004, Karnataka, India

<sup>g</sup> Centre for Biotechnology, Pravara Institute of Medical Sciences (Deemed to be University), Loni – 413 736, Ahmednagar, Maharashtra, India

<sup>h</sup> School of Physical Sciences, Amrita Vishwa Vidyapeetham, Mysuru Campus, Mysuru, Karnataka 570 026, India

### ARTICLE INFO

#### Keywords:

Schiff base  
Ni(II) complex  
TGA  
Antimicrobial  
Anticancer activity

### ABSTRACT

This work presents the preparation and spectral characterization of five diphenylsulphone derived Schiff base ligands (L<sub>1</sub>–L<sub>5</sub>). Using the aforementioned ligands, Ni(II) complexes were synthesized in 1:1 stoichiometric ratio. The synthesized ligands and their complexes were characterized by elemental analysis, <sup>1</sup>H NMR, UV–Visible, FT-IR, ESI-MS, TGA analysis and magnetic susceptibility measurements. The results from the above analytical techniques revealed that the complexes are in an octahedral geometry. The antimicrobial activity of the synthesized Schiff base ligands and their metal complexes under study was carried out by using the agar well diffusion method. Further, the anticancer properties of the synthesized compounds are performed against MCF-7 cell line and human lung cancer cell line A-549 using Adriamycin as standard drug. The biological potency of the metal complexes were significant than their respective ligands.

### Introduction

Schiff base ligand plays a pivotal role in coordination chemistry, as it is one of the most important chemical compounds in medicinal inorganic chemistry with several pharmacological activities [1]. The ease of synthesis, donor capacity, and its stability make it a more prominent organic ligand [2]. 4, 4'-diaminodiphenylsulphone (Dapsone), a sulphone analog, has been proved to be a powerful antimicrobial agent [3].

Dapsone is an important pharmaceutical drug, mostly used in combination with rifampicin and clofazimine as multidrug therapy (MDT) for the treatment of leprosy infections [4]. It also shows pharmacological activity against mycobacterium leprea that occurs as cross activity in HIV infected patients [5]. Hence, 4, 4'-diaminodiphenylsulphone (Dapsone) is used for the synthesis of various aromatic Schiff bases with

biological properties. Salicylaldehyde and its derivatives are useful carbonyl precursors for the synthesis of a large variety of Schiff bases. Additional coordinating groups attached to salicylaldehyde increase the denticity of the Schiff bases and their ability to generate polynuclear complexes. Salicylaldehyde derivative is 3-methoxysalicylaldehyde (o-vanilin), which was largely employed for the synthesis of compartmental ligands [6].

Nickel complexes are extensively studied in coordination chemistry because of their stability and wide applications. Ni(II) ion forms complexes with Schiff bases, in different geometries such as octahedral, tetrahedral, square planar, etc. Particularly, the octahedral and square planar geometries are most usual, however, tetrahedral, trigonal bipyramidal and square-based pyramidal geometries are not usual [7]. Due to different oxidation states, Nickel complexes have a strong role in

\* Corresponding authors.

E-mail addresses: [mk.microbiology@hamu.ac.in](mailto:mk.microbiology@hamu.ac.in) (R.M. Khobragade), [chandans@jssuni.edu.in](mailto:chandans@jssuni.edu.in) (C. Shivamallu), [raghavendra@pmtpims.org](mailto:raghavendra@pmtpims.org) (H.L. Raghavendra), [rasayanshg@gmail.com](mailto:rasayanshg@gmail.com) (S.H. Gaikwad), [shivachemist@gmail.com](mailto:shivachemist@gmail.com) (S.P. Kollur).

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Article

# In Vitro Anticancer Screening, Molecular Docking and Antimicrobial Studies of Triazole-Based Nickel(II) Metal Complexes

Sachin A. Deodware<sup>1,2</sup>, Umesh B. Barache<sup>3</sup>, Pratibha C. Dhale<sup>2</sup>, Kundalkesha D. Gaikwad<sup>2</sup>, Chandan Shivamallu<sup>4</sup>, Panchsheela A. Ubale<sup>5</sup>, Ali A. Shati<sup>6</sup>, Mohammad Y. Alfaifi<sup>6</sup>, Serag Eldin I. Elbehairi<sup>6,7</sup>, Raghu Ram Achar<sup>8</sup>, Ekaterina Silina<sup>9</sup>, Victor Stupin<sup>9</sup>, Juan Frau<sup>10</sup>, Norma Flores-Holguín<sup>11</sup>, Shashikant H. Gaikwad<sup>2,\*</sup>, Shiva Prasad Kollur<sup>12,\*</sup> and Daniel Glossman-Mitnik<sup>11</sup>



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**Citation:** Deodware, S.A.; Barache, U.B.; Dhale, P.C.; Gaikwad, K.D.; Shivamallu, C.; Ubale, P.A.; Shati, A.A.; Alfaifi, M.Y.; Elbehairi, S.E.I.; Achar, R.R.; et al. In Vitro Anticancer Screening, Molecular Docking and Antimicrobial Studies of Triazole-Based Nickel(II) Metal Complexes. *Molecules* **2022**, *27*, 6548. <https://doi.org/10.3390/molecules27196548>

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- <sup>1</sup> Arts, Science and Commerce College, Naldurg, Osmanabad 413 602, Maharashtra, India
  - <sup>2</sup> Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Solapur 413 411, Maharashtra, India
  - <sup>3</sup> School of Chemical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur 413 255, Maharashtra, India
  - <sup>4</sup> Department of Biotechnology and Bioinformatics, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, Karnataka, India
  - <sup>5</sup> Department of Chemistry, N. K. Orchid College of Engineering and Technology, Solapur 413 002, Maharashtra, India
  - <sup>6</sup> Biology Department, Faculty of Sciences, King Khalid University, Abha 61421, Saudi Arabia
  - <sup>7</sup> Cell Culture Lab, Egyptian Organization for Biological Products and Vaccines (VACSERA Holding Company), 51 Wezaret El-Zeraa St., Agouza, Giza 12311, Egypt
  - <sup>8</sup> Division of Biochemistry, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, Karnataka, India
  - <sup>9</sup> Department of Hospital Surgery, N.I. Pirogov Russian National Research Medical University (RNRMU), 117997 Moscow, Russia
  - <sup>10</sup> Departament de Química, Facultat de Ciències, Universitat de les Illes Balears, E-07122 Palma de Mallorca, Spain
  - <sup>11</sup> Laboratorio Virtual NANOCOSMOS, Departamento de Medio Ambiente y Energía, Centro de Investigación en Materiales Avanzados, Chihuahua 31136, Chih, Mexico
  - <sup>12</sup> School of Physical Sciences, Amrita Vishwa Vidyapeetham, Mysuru Campus, Mysuru 570 026, Karnataka, India
- \* Correspondence: [rasayanshg@gmail.com](mailto:rasayanshg@gmail.com) (S.H.G.); [shivachemist@gmail.com](mailto:shivachemist@gmail.com) (S.P.K.)

**Abstract:** Herein we describe the synthesis of a series of nickel(II) complexes (C1–C3) with Schiff bases (HL1–HL3) derived from 4-amino-5-mercapto-3-methyl-1,2,4-triazole and ortho/meta/para-nitrobenzaldehyde having composition  $[\text{Ni}(\text{L})_2(\text{H}_2\text{O})_2]$ . The obtained ligands and their complexes were characterized using physico-chemical techniques viz., elemental analysis, magnetic moment study, spectral (electronic, FT-IR, <sup>1</sup>H-NMR) and thermal analysis. The elemental analysis and spectral analysis revealed that Schiff bases behave as monoanionic bidentate ligands towards the Ni(II) ion. Whereas, the magnetic moment study suggested the octahedral geometry of all the Ni(II) complexes. The thermal behavior of the complexes has been studied by thermogravimetric analysis and agrees well with the composition of complexes. Further, the biological activities such as antimicrobial and antifungal studies of the Schiff bases and Ni(II) complexes have been screened against bacterial species (*Staphylococcus aureus* and *Pseudomonas aeruginosa*) and fungal species (*Aspergillus niger* and *Candida albicans*) activity by MIC method, the results of which revealed that metal complexes exhibited significant antimicrobial activities than their respective ligands against the tested microbial species. Furthermore, the molecular docking technique was employed to investigate the active sites of the selected protein, which indeed helped us to screen the potential anticancer agents among the synthesized ligand and complexes. Further, these compounds have been screened for their in vitro anticancer activity using OVCAR-3 cell line. The results revealed that the complexes are more active than the ligands.





# Extraction of Th(IV) and U(VI) with 4-methyl-N-n-octylaniline as an extracting agent

Prajakta S. More<sup>1</sup> · Umesh B. Barache<sup>2,3</sup> · Shashikant H. Gaikwad<sup>3</sup> · Laxman V. Gavali<sup>4</sup>

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## Abstract

The liquid–liquid extraction of Th(IV) and U(VI) with 4-methyl-N-n-octylaniline as an extracting agent are presented in detail. The optimum conditions for the distribution of Th(IV) and U(VI) between aqueous H<sub>2</sub>SO<sub>4</sub> acid and 4-methyl-N-n-octylaniline in xylene are performed. The effect of acidity and extracting agent concentration on the metal extraction are also studied. The range of H<sub>2</sub>SO<sub>4</sub> concentration investigated for quantitative evoking of Th(IV) was 0.7–0.9 mol L<sup>-1</sup> using 2.0% of the reagent. The 0.1 mol L<sup>-1</sup> nitric acid was used as strippant for Th(IV) loaded organic phase. Similarly, the range of H<sub>2</sub>SO<sub>4</sub> concentration investigated was 0.8 to 1.8 mol L<sup>-1</sup> for quantitative evoking of U(VI) with 4.0% reagent concentration. Acetate buffer having pH of 4.5 was employed for stripping of U(VI) from the organic phase. Hence 4-methyl-N-n-octylaniline in xylene was found to be suitable reagent for extraction of Th(IV) and U(VI). The recovery percentages were warranted the accuracy and found around 99.2%. In addition, relative SD values were below 3%. The selective stripping was found to be useful for their mutual separation and determination.

**Keywords** Liquid–liquid extraction · Th(IV) · U(VI) · 4-methyl-N-n-octylaniline · Organic phase · Distribution

## Introduction

Uranium is relatively highly abundant naturally occurring radioactive element present in the earth crust as well as in sea water. Thorium is a radioactive metal mostly associated with uranium and rare earths. Thorium as well as uranium are used in nuclear power generation and military weapons. Phosphate rock contains appreciable and recoverable amount of thorium and uranium in the ppm range [1–3]. Monazite

is the most important rare earth phosphate containing thorium associated with uranium [4, 5]. Many analytical methods has been invented for the determination of U and Th in the phosphate rocks and in the aqueous solution obtained by their decomposition using mineral acids [6, 7]. Acid or alkaline leaching [8], ion exchange [9], solvent extraction, precipitation [10] are some common techniques used for the preconcentration, recovery and purification of these metals.

Various ion exchange resins comprising amidoximes and related compounds [11, 12] modified chitosan (CTS) i.e. non-acetylated chitin and related compounds [13], impregnated resins were employed in solid phase extraction of uranium. In solvent extraction technique the extractant plays key role. Many phosphorus based extractants, number of sulphur based extractants, schiff's bases and heterocyclic compounds enclosing isoxazolones, pyrazolones, crown ethers used as an extractant in solvent extraction systems of uranium have been published in the literature [14–16].

Several aromatic and aliphatic long chain amines such as Amberlite LA-1 / LA-2 [17], 2-Octylamino pyridine [18], N-n-octylaniline [19], Tri-n-octylamine (Tri-n-octylamine Thorium [20], Tri-n-octylamine Uranium [21, 22], Tri-iso-octylamine [23], synergism of N-n-octylaniline and trioctylamine [24], alamine 310 and alamine 336 [25–27]

✉ Umesh B. Barache  
umesh.barache@gmail.com

✉ Laxman V. Gavali  
laxmanvg70@gmail.com

<sup>1</sup> Department of Chemistry, Smt. Chandibai Himathmal Mansukhani College, Ulhasnagar 421003, Maharashtra, India

<sup>2</sup> School of Chemical Sciences, Purnyashlok Ahilyadevi Holkar Solapur University, Solapur 413255, Maharashtra, India

<sup>3</sup> Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi 413411, Maharashtra, India

<sup>4</sup> Department of Chemistry, Karmaveer Bhaurao Patil College, Vashi, Navi Mumbai 400703, Maharashtra, India



Article

# Preparation, Characterization and In Vitro Biological Activities of New Diphenylsulphone Derived Schiff Base Ligands and Their Co(II) Complexes

Kundalkesha D. Gaikwad <sup>1,2</sup>, Panchsheela Ubale <sup>3</sup>, Rahul Khobragade <sup>4</sup>, Sachin Deodware <sup>2</sup>, Pratibha Dhale <sup>2</sup>, Mahadev R. Asabe <sup>5</sup>, Rekha M. Ovhal <sup>5</sup>, Pranav Singh <sup>6</sup>, Prashant Vishwanath <sup>7</sup>, Chandan Shivamallu <sup>8</sup>, Raghu Ram Achar <sup>9</sup>, Ekaterina Silina <sup>10,11</sup>, Victor Stupin <sup>10</sup>, Natalia Manturova <sup>10</sup>, Ali A. Shati <sup>12</sup>, Mohammad Y. Alfaifi <sup>12</sup>, Serag Eldin I. Elbehairi <sup>12,13</sup>, Shashikant H. Gaikwad <sup>2,\*</sup> and Shiva Prasad Kollur <sup>14,\*</sup>

- <sup>1</sup> Department of Chemistry, Sangameshawar College, Solapur 413 001, India
- <sup>2</sup> Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Solapur 413 411, India
- <sup>3</sup> Department of Chemistry, N. K. Orchid College of Engineering and Technology, Solapur 413 002, India
- <sup>4</sup> Department of Microbiology, Dr. Babasaheb Ambedkar Marathwada University, Sub Campus, Osmanabad 413 501, India
- <sup>5</sup> Department of Chemistry, Walchand College of Art and Science, Solapur 413 006, India
- <sup>6</sup> Department of Medicine, Kasturba Medical College, Manipal Academy of Higher Education, Udupi 576 104, India
- <sup>7</sup> Centre for Excellence in Molecular Biology and Regenerative Medicine, Department of Biochemistry, JSS Medical College, JSS Academy of Higher Education and Research, Mysuru 570 015, India
- <sup>8</sup> Department of Biotechnology and Bioinformatics, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, India
- <sup>9</sup> Division of Biochemistry, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, India
- <sup>10</sup> Department of Hospital Surgery, N.I. Pirogov Russian National Research Medical University, Moscow 117997, Russia
- <sup>11</sup> Institute of Biodesign and Modeling of Complex Systems, I.M. Sechenov First Moscow State Medical University (Sechenov University), Moscow 119991, Russia
- <sup>12</sup> Biology Department, Faculty of Science, King Khalid University, Abha 9004, Saudi Arabia
- <sup>13</sup> Cell Culture Lab, Egyptian Organization for Biological Products and Vaccines (VACSERA Holding Company), 51 Wezaret El-Zeraa St., Giza 22311, Egypt
- <sup>14</sup> School of Physical Sciences, Amrita Vishwa Vidyapeetham, Mysuru Campus, Mysuru 570 026, India
- \* Correspondence: rasayanshg@gmail.com (S.H.G.); shivachemist@gmail.com (S.P.K.)



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**Abstract:** The present work describes the chemical preparation of Schiff bases derived from 4,4'-diaminodiphenyl sulfone (L<sub>1</sub>–L<sub>5</sub>) and their Co(II) metal complexes. The evaluation of antimicrobial and anticancer activities against MCF-7 cell line and human lung cancer cell line A-549 was performed. The aforementioned synthesized compounds are characterized by spectroscopic techniques and elemental analysis confirms successful synthesis. The results from the above analytical techniques revealed that the complexes are in an octahedral geometry. The antimicrobial activity of the synthesized Schiff base ligands and their metal complexes under study was carried out by using the agar well diffusion method. The ligand and complex interactions for biological targets were predicted using molecular docking and high binding affinities. Further, the anticancer properties of the synthesized compounds are performed against the MCF-7 cell line and human lung cancer cell line A-549 using adriamycin as the standard drug.

**Keywords:** 4,4'-diaminodiphenyl sulfone; Schiff base; Co(II) complex; antimicrobial; anticancer activity

## 1. Introduction

Coordination compounds play an important role in our daily lives, with applications ranging from biology to industry. Because of their high selectivity and target specificity in

Department of Botany  
**Shri Shivaji Mahavidyalaya, Barshi**  
and

Department of Botany  
**K. N. Bhise Arts, Commerce and Vinayakrao Patil**  
**Science College, Vidyanagar, Bhosare .**  
Organizes

**A Lecture (under MOU )**

on

**Extraction and Detection of Metabolites from**  
**Medicinal Plants**

Speaker

**Dr. Sandip Pai.**

assistant Professor ,  
Dada Patil Mahavidyalaya, Karjat

**I/C Prin. Dr. Bharati Revadkar**  
President

Shri Shivaji Mahavidyalaya, Barshi

**Mr. Goyal A. M.**  
Head, Department of Botany  
K. N. Bhise College, Bhosare

**Dr. Sandhya Gaikwad**  
Head, Department of Botany  
Shri Shivaji Mahavidyalaya, Barshi

**DATE - 21/03/2022, Time 11.30 - 1.00 pm**

Join by Zoom Link :

**<https://us02web.zoom.us/j/9757786217?pwd=cUZlZmc0RTBBME1lRFBYb0c5N2toQT09>**

Madha Taluka Shikshan Prasarak Mandal's  
**K.N.Bhise Arts, Commerce and Vinayakrao Patil  
Science College, Vidyanagar, Bhosare**

Paranda Road, Kurduwadi Tal-Madha Dist-Solapur Pin-413 208 (Maharashtra)

E-mail:-knbacck@yahoo.co.in

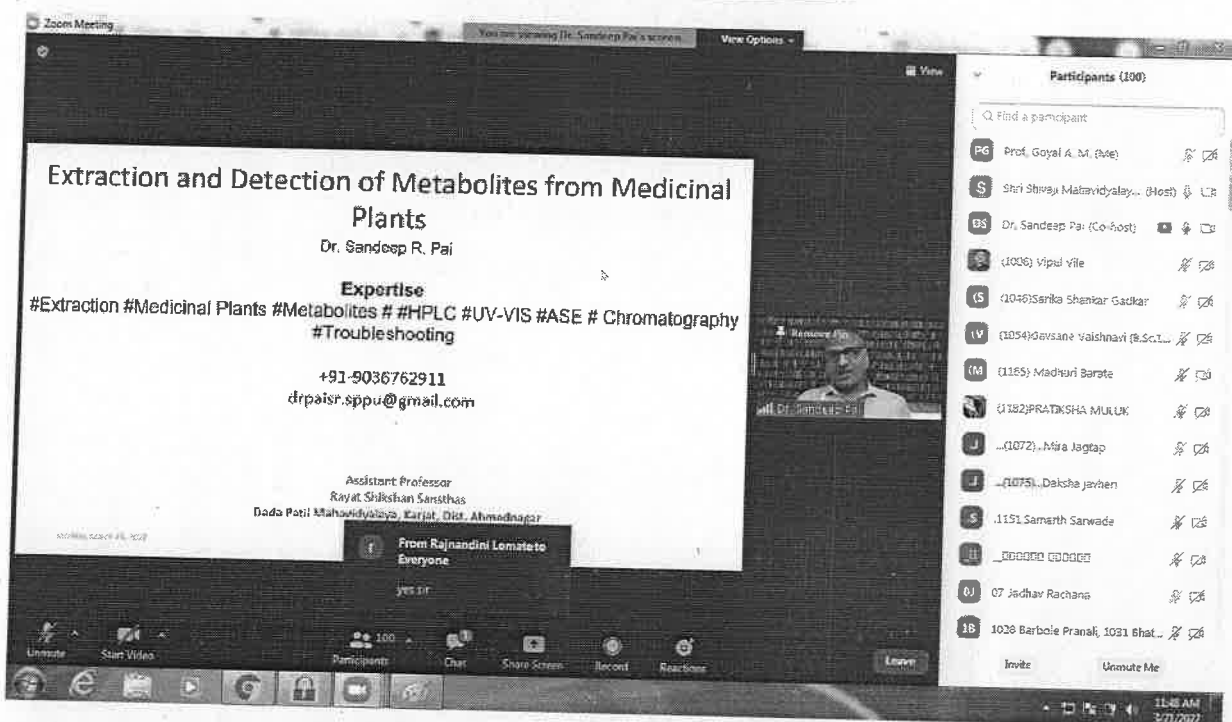
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No.KNBACVPSCVB/

Date :21/03/2022

### Report on MOU Activity



Department of Botany of ShriShivajiMahavidyalaya, Barshi and Department of Botany of K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College, Vidyanagar, Bhosare, Organizes an online Lecture on “Extraction and Detection of Metabolites from Medicinal Plants” by Dr. Sandeep R. Pai. Assistant Professor, Dada Patil Mahavidyalaya, Karjat.

Date of Activity : 21/03/2022

Name of Speaker : **Dr. Sandeep R. Pai.**  
Assistant Professor,  
Dada Patil Mahavidyalaya, Karjat

Name of Organizer : ShriShivajiMahavidyalaya, Barshi

And

K. N. Bhise Arts, Commerce and  
Vinayakrao Patil Science College,  
Vidyanagar, Bhosare

Number of Participants : 100

Participation of students in the activity was overwhelming and knowledge shared was very useful to students, teachers and researchers. This was an activity under MOU. This activity was highly successful.

*Bauy*  
I/c.Principal  
K.N.Bhise Arts,Commerce &  
Vinayakrao Patil Science College  
Vidyanagar Bhosare,Dist-Solapur



**Department of Botany  
Shri Shivaji Mahavidyalaya, Barshi  
and  
Department of Botany  
K. N. Bhise Arts, Commerce and Vinayakrao Patil  
Science College, Vidyanagar, Bhosare .  
Organizes**

**A Lecture (under MOU )**

**on**

**Journalism and its changing scenario**

**Speaker**

**Mr. Sanjay Miskin.**

**Journalist ,  
Sakal Media Group Mumbai**

**I/C Prin. Dr. P. S. Kamble**

**President**

**Principal, K.N. Bhise Arts, Commerce and Vinayakrao  
Patil Science College**

**Mr. Goyal A. M.**

**Head, Department of Botany  
K. N. Bhise Mahavidyalay, Bhosare**

**Dr. Sandhya Gaikwad**

**Head, Department of Botany  
Shri Shivaji Mahavidyalay, Barshi**

**DATE - 22/03/2022, Time 11.30 - 1.00 pm**

**VENUE – Hall No 14**

Madha Taluka Shikshan Prasarak Mandal's  
**K.N.Bhise Arts, Commerce and Vinayakrao Patil  
Science College, Vidyanagar, Bhosare**

Paranda Road, Kurduwadi Tal-Madha Dist-Solapur Pin-413 208 (Maharashtra)

E-mail:-knbacck@yahoo.co.in

Phone No. :- (02183)223245

Fax No. :- (02183)223245

No.KNBACVPSCVB/

Date :22/03/2022

**Report on MOU Activity**



Department of Botany of ShriShivajiMahavidyalaya, Barshi and Department of Botany of K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College, Vidyanagar, Bhosare, Organizes an online Lecture on "Journalism and its changing scenario" by Mr. Sanjay Miskin, Journalist, Sakal Media Group, Mumbai.

Date of Activity : 22/03/2022

Name of Speaker : Mr. Sanjay Miskin.  
Journalist,  
Sakal Media Group, Mumbai.

Name of Organizer : ShriShivajiMahavidyalaya, Barshi

And

K. N. Bhise Arts, Commerce and  
Vinayakrao Patil Science College,  
Vidyanagar, Bhosare

Number of Participants : 56

Interest of students in the activity was overwhelming and knowledge shared was useful to students and teachers. This was an activity under MOU. This activity was highly successful.

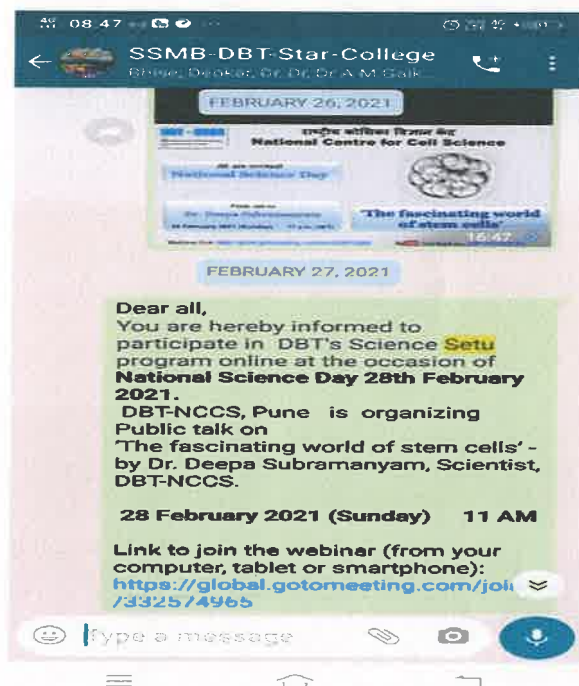
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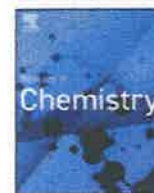
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Vinayakrao Patil Science College  
Vidyanagar Bhosare,Dist-Solapur**





Participation of staff and students in Popular Talk by Dr Deepa Subramanyam  
(NCCS Pune) "Fascinating world of stem cells"





## Newly synthesized triazole-based Schiff base ligands and their Co(II) complexes as antimicrobial and anticancer agents: Chemical synthesis, structure and biological investigations

Sachin A. Deodware<sup>a</sup>, Umesh B. Barache<sup>a</sup>, Umakant B. Chanshetti<sup>b</sup>, D.J. Sathe<sup>c</sup>,  
Ubale Panchsheela Ashok<sup>d,e</sup>, Shashikant H. Gaikwad<sup>f,g</sup>, Shiva Prasad Kollur<sup>f,g</sup>

<sup>a</sup> Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi, Solapur 413 411, Maharashtra, India

<sup>b</sup> Jawahar Arts, Science and Commerce College, Anandur, Osmanabad 413 501, Maharashtra, India

<sup>c</sup> Department of Chemistry, Kolhapur Institute Technology's College of Engg. (Autonomous), Kolhapur 416 234, Maharashtra, India

<sup>d</sup> Department of Chemistry, Rajaram College, Kolhapur 416 004, Maharashtra, India

<sup>e</sup> N.K. Orchid College of Engineering and Technology, Solapur 413 002, Maharashtra, India

<sup>f</sup> Department of Sciences, Amrita School of Arts and Sciences, Amrita Vishwa Vidyapeetham, Mysuru Campus, Mysuru 570 026, Karnataka, India

### ARTICLE INFO

#### Keywords:

1,2,4-triazole  
Schiff base  
Co(II) complexes  
Antimicrobial  
Anticancer

### ABSTRACT

The new Schiff base ligands 4-(2'/3'/4'-nitrobenzylideneimino)-3-methyl/ethyl-5-mercapto-1,2,4-triazole and their Co(II) metal complexes were synthesized and characterized by elemental analysis, magnetic moment measurements, thermal studies, electronic absorption and NMR spectroscopy. The ligands were synthesized by condensation of 4-amino-5-mercapto-3-methyl/ethyl-1,2,4-triazole with 2/3/4-nitrobenzaldehyde. On the basis of electronic absorption spectral data and magnetic susceptibility measurements, the octahedral geometry has been proposed for all the Co(II) complexes. Further, the ligands and Co(II) complexes have been screened for their antimicrobial activities against bacteria (*Staphylococcus aureus*, *Pseudomonas aeruginosa*) and fungi (*Aspergillus niger* and *Candida albicans*). Furthermore, the synthesized compounds were also screened for anticancer activity on human cancer cell lines such as breast (MCF7), lung (NCI-H226), prostate (PC-3) and ovary (OVCAR-3) by sulforhodamine-B (SRB) colorimetric assay.

### Introduction

Nowadays, heterocyclic chemistry has become a separate field of chemistry for present society and for future prospects in scientific field, as nitrogen, oxygen and sulphur are most well-known hetero atoms with significant role in biological systems. Due to implications in drugs and industrial studies, heterocyclic compounds are considered as one of the important class of organic compounds [1,2]. The most important type of heterocyclic compounds are five membered triazoles with three nitrogen atoms and two carbon atoms [3]. Amine and thione-substituted triazoles have been studied as antibacterial, antifungal, anticancer, antitumor, anticonvulsant, anti-inflammatory and analgesic properties [4-9]. Triazoles contain both hard nitrogen and soft sulphur atoms in the form of thio amide, hence they act as good coordinating ligands [10]. Such type of ligands have donor group that can coordinate with wide range of metal ions [11]. The potential coordinate sites are i) nitrogen of primary

amino group ii) sulphur of thiol group and iii) two nitrogen atoms at position 1 and 2 in triazole ring system [11]. These ligands contain S=C-N-N unit that allows for bidentate coordination with metal ions through amine and thio substitution to form a stable five membered ring [12]. Thus ligand is polydentate and complexes derived from it are called chelate complexes. These factors prompted us to carry out a study on triazoles. The aim of present study is to modify bioactivities of 1,2,4-triazole Schiff base and obtain the relative derivatives with better curing effect and improve bioavailability by coordinating them with Co(II) ion.

Cobalt has a pronounced affinity for coordination because of its smaller size and higher nuclear charge. Literature survey reveals that, cobalt complexes are important as medicine and show variety of biological activities [13-19]. Our earlier report [20] suggest that Co(II) complexes derived from 4-amino-5-mercapto-3-methyl-1,2,4-triazole and 2/3/4-nitrobenzaldehyde exhibit excellent anticancer activity. Also, no work has been reported on the synthesis of Co(II) complexes

\* Corresponding authors.

E-mail addresses: [raspyanshg@gmail.com](mailto:raspyanshg@gmail.com) (S.H. Gaikwad), [shivachemist@gmail.com](mailto:shivachemist@gmail.com) (S. Prasad Kollur).

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माडा तालुका शिक्षण प्रसारक मंडळ संचालित,  
के. एन. भिसे आर्ट्स, कॉमर्स अँड विनायकराव पाटील  
सायन्स कॉलेज, विद्यानगर भोसरे

परांडा रोड, विद्यानगर भोसरे ता. माडा जि. सोलापूर ४१३ २०८ (महाराष्ट्र)

दुरध्वनी क्रमांक : (०२१८३) २२३२४५

फॅक्स क्रमांक : (०२१८३) २२३२४५

क्र.सं. : के.एन.बी.ए.सी.सी.के./ २२६९ / २०२९

दिनांक : २२-११-२०२९.

आभार पत्र

प्रति.

प्रा. डॉ. व्ही. एम. गुरमे

श्री शिवाजी महाविद्यालय, बाशी

महोदय,

आपण आमचे महाविद्यालयाच्या विनंतीस मान देवून दिनांक २२.११.२०२१ रोजी महाविद्यालयातील सर्व शिक्षक व शिक्षकेतर कर्मचारी यांना नॅक ( NAAC 3<sup>rd</sup> Cycle ) समितीस सामोरे जाण्यासाठी मार्गदर्शक म्हणून उपस्थित राहून मार्गदर्शन केले त्या बद्दल आम्ही आपले आभारी आहोत.

नॅकच्या कामकाजा बाबत आपणास असलेल्या अनुभवातून कोणत्या प्रकारची कामे महाविद्यालयातील प्राध्यापकांनी नॅक समितीस सामोरे जातांना करावी या बाबत कार्यशाळा घेऊन मार्गदर्शन केले व सर्व शिक्षक व शिक्षकेतर कर्मचारी यांचा उत्साह वाढविला त्या बाबत आम्ही आपले आभारी आहोत. आपण केलेले हे मार्गदर्शन महाविद्यालयाच्या नॅक करीता बहुमोल ठरणार आहे. आपण या पूर्वीही या नॅक संदर्भात मार्गदर्शन केलेले आहे. महाविद्यालयातही आपल्याकडून अशाच प्रकारचे सहकार्य लाभेल ही अपेक्षा.

धन्यवाद!

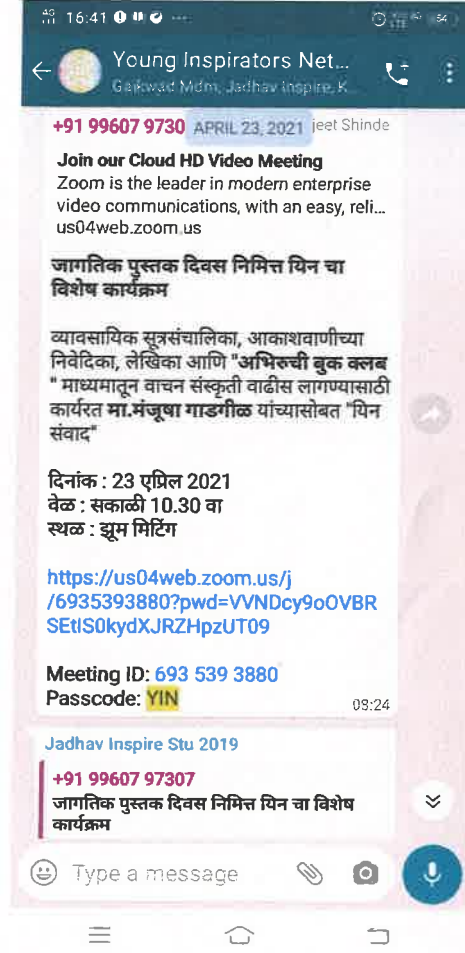


प्राचार्य

के. एन. भिसे आर्ट्स, कॉमर्स अँड  
विनायकराव पाटील सायन्स कॉलेज,  
विद्यानगर भोसरे, जि. सोलापूर

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## Popular Talk by Miss Manjusha Gadagil : World Book Day

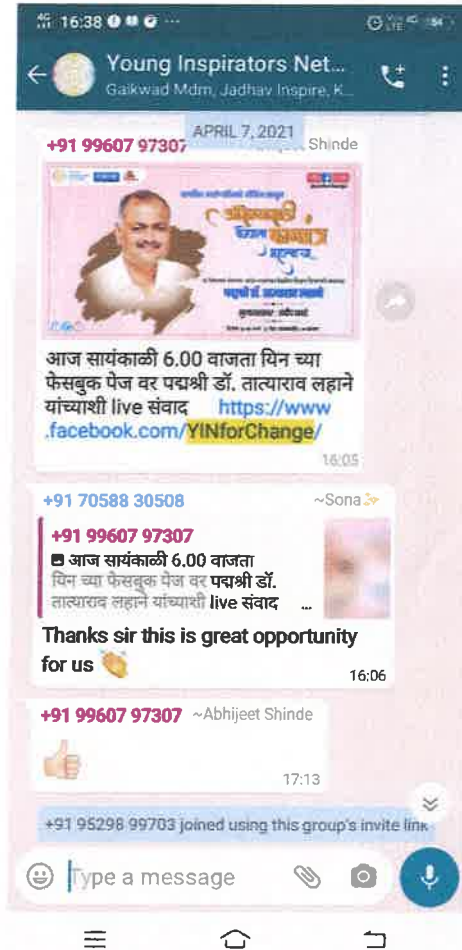




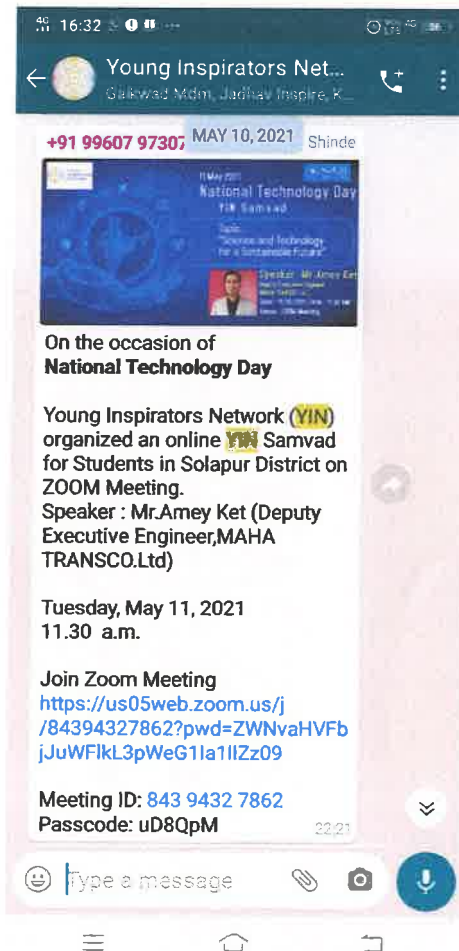
## Popular Talk by Dr. Gayatri Deshpande: World Health Day



## Tips for health in Covid-19 pandemic by Dr Tatyrao Lahane



# National Technology Day: YIN Samvad



## YIN Mission COVID @36





## Programs conducted in Collaboration with YIN

### Biodiversity in Kokan and sustainable rural development



'ज्ञान, विज्ञान आणि सुसंस्कार यासाठी शिक्षण प्रसार'  
- शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

**RAMKRISHNA PARAMHANSA MAHAVIDYALAYA**  
**OSMANABAD-413501 (MAHARASHTRA)**

Ph.No./ Fax (02472) (Off.) 222231 (Resi.) 223455  
E-mail : osdrpcollege@yahoo.com  
Website : www.rpmahavidyalaya.org

Date : 20 / 12 / 2021

To  
Dr. V. M. Gurame,  
Co-ordinator, IQAC and  
DBT-STAR College Scheme,  
Shri Shivaji Mahavidyalaya,  
Barshi.

Subject: Invitation as Resource Person for one day workshops on 'Preparation of AQAR by New Guidelines of NAAC' and 'Mentoring of DBT-Star College Scheme'.

Dear Sir,

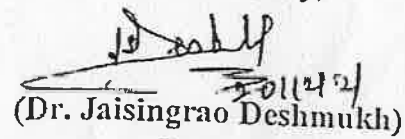
Our college is organizing one day workshops on 'Preparation of AQAR by New Guidelines of NAAC' and 'Mentoring of DBT-Star College Scheme' on 21<sup>st</sup> December, 2021 at 11.30 am.

We invite you as a Resource person for the workshop.

Kindly accept the invitation.

Thank you.

Yours faithfully,

  
(Dr. Jaisingrao Deshmukh)

Principal  
Ramkrishna Paramhansa  
Mahavidyalaya, Osmanabad

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## Original article

## Pristine and palladium-doped perovskite bismuth ferrites and their nitrogen dioxide gas sensor studies



Shivaji D. Waghmare<sup>a,b</sup>, Siddheshwar D. Raut<sup>b</sup>, Balaji G. Ghule<sup>b</sup>, Vijaykumar V. Jadhav<sup>c</sup>, Shoyebmohamad F. Shaikh<sup>d,\*</sup>, Abdullah M. Al-Enizi<sup>d</sup>, Mohd Ubaidullah<sup>d</sup>, Ayman Nafady<sup>d</sup>, Badr M. Thamer<sup>d</sup>, Rajaram S. Mane<sup>b,\*</sup>

<sup>a</sup> Department of Physics, Shri. Shivaji Mahavidyalaya, Barshi, Solapur, India

<sup>b</sup> School of Physical Sciences, S. R. T. M. University, Nanded 431606, M.S., India

<sup>c</sup> Department of Physics, Shivaji Mahavidyalaya, Udgir, Latur, India

<sup>d</sup> Department of Chemistry, College of Science, King Saud University, Riyadh 11451, Saudi Arabia

## ARTICLE INFO

## Article history:

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## Keywords:

BiFeO<sub>3</sub> and Pd-BiFeO<sub>3</sub>

NO<sub>2</sub> gas sensors

Sol-gel synthesis

Structural elucidation

Dual surface morphology

## ABSTRACT

Undoped and palladium-doped perovskite bismuth ferrite nitrogen dioxide (NO<sub>2</sub>) gas sensors (BiFeO<sub>3</sub> i.e. BFO and Pd-BiFeO<sub>3</sub> i.e. Pd-BFO) are successfully synthesized via an easy and low-cost sol-gel process. The Pd-doping in BFO is confirmed through an X-ray diffraction data, field emission scanning electron microscopy images, energy-dispersive X-ray spectroscopy analysis, and its influence on the structure, morphology, surface area, and the NO<sub>2</sub> gas sensor performance of the BFO sensor has been examined and explored. Moreover, the plausible gas sensing response mechanism of Pd-BFO film sensor has also been proposed. The nanocubes embedded into a uniformly distributed upright standing nanoplates facilitate better gas adsorption and diffusion behavior on providing an excellent NO<sub>2</sub>-sensing performance with good sensitivity, excellent selectivity, better response (90 s)/recovery (110 s), and noticeable repeatability under a fixed 100 ppm NO<sub>2</sub> gas concentration level at an optimized low operating temperature i.e. 150 °C. © 2020 The Author(s). Published by Elsevier B.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

## 1. Introduction

Nitrogen dioxide (NO<sub>2</sub>), as one of the important sources for air pollutant, has attracted a considerable attention due to its adverse impact on human life and environmental concerns (Liu et al., 2019) (Liu et al., 2019) (Liu et al., 2019) (Liu et al., 2019). On ground level, 15 ppb of NO<sub>2</sub> gives rise to irritation of eyes, nose and throat; for middle 30 ppb, people can be infected by airway hyperactivity of muscles; and upper 80 ppb level, the respiratory tract infections are drastically increased (Liu et al., 2016). Detection of toxic and hazardous gases at an early stage is major concern. Therefore, there is an urgent need to develop a new class materials of high-performance gas sensors to detect the NO<sub>2</sub> gas in an economic

way. In last few years, ternary metal oxides based on perovskite ABO<sub>3</sub> type structures demonstrated steadfast gas-sensing properties and performance compared to other binary oxides, which could be due to different analytes ranging from cations and their capability to accept various doping elements (George K et al., 2020). Ferrites with various perovskite-based structures i.e. BiFeO<sub>3</sub>, LaFeO<sub>3</sub>, PrFeO<sub>3</sub>, EuFeO<sub>3</sub>, GdFeO<sub>3</sub>, have demonstrated different degrees of gas sensor performance (Niu et al., 2004; Siemons et al., 2007).

Recently, various metal dopants in perovskite-based ferrite structures are used to enhance their gas sensing response and selectivity towards various gases. Fan et al. reported that the Ba-substituted BFO sensor increased gas-sensing performance due to presence of a large concentration of oxygen vacancy as compared to pure BFO (Dong et al., 2015). Mane et al. reported a high performance of tungsten-doped BFO nano sensor over pristine for NO<sub>2</sub> gas (Waghmare et al., 2018). Pal et al. approved 25 s response/17 s recovery time at low concentration of acetone vapour for BFO nanoparticle-sensors (Chakraborty and Pal, 2019). Mursalin et al. reported sono-chemically synthesis of BFO nanoparticle sensors with an outstanding SO<sub>2</sub> gas sensing performance and ultrafast response/recovery time (Das et al., 2015). Pal et al. prepared BFO

\* Corresponding authors.

E-mail addresses: [sshaikh1@ksu.edu.sa](mailto:sshaikh1@ksu.edu.sa) (S.F. Shaikh), [rajarammane70@srtmun.ac.in](mailto:rajarammane70@srtmun.ac.in) (R.S. Mane).

Peer review under responsibility of King Saud University.



<https://doi.org/10.1016/j.jksus.2020.08.024>

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Training of Community College Student at Shri Laxminarayan Dal Mil Barshi





**Bharati Vidyapeeth's**  
**Dr. Patangrao Kadam Mahavidyalaya, Sangli**  
Internal Quality Assurance Cell

## **Faculty Training Programme**

12<sup>th</sup> October to 16<sup>th</sup> October 2020

*Certificate*

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This certificate is presented to Dr. V. M. Gurame of Shri. Shivaji College, Barshi for working as a Resource Person at Faculty Training Programme organized by Internal Quality Assurance Cell of our College during 12<sup>th</sup> to 16<sup>th</sup> October 2020.

*Dr. A. R. Supale*

(Dr. A. R. Supale)  
Coordinator

*Dr. D. G. Kanase*

(Prin. Dr. D. G. Kanase)  
Chairman



**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**  
( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH – India

**Prin. Dr. P. R. Thorat**  
M. Sc., Ph. D.



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : ssmbarshi@rediffmail.com

Ref. No.

Date : 01.01.2020

To,  
**Medical Officer,**  
**Pushpan Imaging Centre, Barshi**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Godage Akash Dadasaheb 2. Pujari Ajinkya Angad 3. Nagtilak Mahesh Yuvraj 4. Waghmare Vijay Ankush students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 02.01.2020 to 02.02.2020

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**PRINCIPAL**  
Shri Shivaji Mahavidyalaya,  
Barshi, Dist. Solapur-413411

## Training Completion Certificate

This is to certify that 1. Godage Akash Dadasaheb 2. Pujari Ajinkya Angad 3. Nagtilak Mahesh Yuvraj 4. Waghmare Vijay Ankush students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Pushpan Imaging Barshi**, from 02.01.2020 to 02.02.2020.

As per our measurements and reporting structure, they are hardworking and have been excellent during the on job training.



**Dr. Vivekanand N. Janrao**

M.D. (Radiodiagnosis)  
Radiologist & Sonologist  
Regd. No.: 68115

"Dissemination of Education for Knowledge, Science & Culture"

- Shikshanmaharshi Dr. Bapuji Salunkhe



Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's  
**RAJE RAMRAO MAHAVIDYALAYA, JATH**

Dist. Sangli (Maharashtra) 416 404

U.G.C. Recognition under 2 F & 12 (B) UGC Act 1956  
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NAAC Reaccredited : "D" (Third Cycle)



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Prin. Abhaykumar Salunkhe  
M.A.

Secretary  
Prin. Mrs. Shubhangi Gawade  
M.Sc., B.Ed.

I/C Principal  
Dr. V. S. Dhekale  
M.Com., M.B.A., M. Phil., Ph.D.

RRMJ/2019-20/531

Date: 10/06/2020

To,  
Dr. Vashishtha M. Gurame  
Shivaji Mahavidyalaya, Barshi.  
Dist: Solapur, Maharashtra, India.

*Invitation Letter*

Subject: Invitation as Resource Person for Online Workshop

Dear Sir,

It gives us an immense pleasure to invite you as a Resource Person for the online workshop on "Revised Accreditation Framework of NAAC and Career Advancement Scheme in HEI" organized by Internal Quality Assurance Cell (IQAC) of Raje Ramrao Mahavidyalaya, Jath, Maharashtra, India on Saturday, 13<sup>th</sup> June 2020 at 10.00 AM. A Zoom Meeting joining link will be shared to you in due time.

Hope that your presence and guidance in the webinar will be an opportunity for participants to have the great experience. Looking forward to welcoming you.

Thanking you,



*(Signature)*

I/C Principal

(Dr. V. S. Dhekale)

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Shri Swami Vivekanand  
Born: 12/12/1862  
Died: 4/7/1902

"Dissemination of Education for Knowledge, Science & Culture"

- Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's  
**RAJE RAMRAO MAHAVIDYALAYA, JATH**

Dist. Sangli (Maharashtra) 416 404

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Dr. Bapuji Salunkhe  
D. Litt.

President

Hon. Chandrahalad Dada Patil  
Minister of Revenue, Relief &  
Rehabilitation, Public Works,  
Govt. of Maharashtra

Chairman

Prin. Abhaykumar Salunkhe  
M.A.

Secretary

Prin. Mrs. Shubhangi Gawade  
M.Sc., D.Ed.

I/C Principal

Dr. V. S. Dhekale  
M.Com., M.B.A., M. Phil., Ph.D.

RRMJ/2019-20/546

Date: 13/06/2020

To,

Dr. Vashishtha M. Gurame

Shri Shivaji Mahavidyalaya, Barshi,

Dist: Solapur, Maharashtra, India.

### Thanking Letter

Subject: Thanks for delievering a lecture as Resource Person in Online Workshop

Dear Sir,

We specially thank you for delievering a lecture as a Resource Person in the online workshop on "Revised Accreditation Framework of NAAC and Career Advancement Scheme in HEI" organized by Internal Quality Assurance Cell (IQAC) of Rajee Ramrao Mahavidyalaya, Jath, Maharashtra, India on Saturday, 13<sup>th</sup> June 2020 at 10.00 AM.

Thanking you,



*V. S. Dhekale*

I/C Principal

(Dr. V. S. Dhekale)



**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**  
( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH - India

**Prin. Dr. P. R. Thorat**  
M. Sc., Ph. D.



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : [ssmbarshi@rediffmail.com](mailto:ssmbarshi@rediffmail.com)

Ref. No.

Date : 13.09.2020

To,  
**Medical Officer,**  
**Dr. Patil Laboratory, Barshi**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Chobe Laxmi Digamber 2. Sarvade Supriya Poapt 3. Kamble Sonali Kalyan 4. Panke Akshay Abhimanyu students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 15.09.2020 to 15.10.2020

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**PRINCIPAL**  
Shri Shivaji Mahavidyalaya,  
Barshi, Dist. Solapur-413411

## Training Completion Certificate

This is to certify that 1. Chobe Laxmi Digamber 2. Sarvade Supriya Poapt 3. Kamble Sonali Kalyan 4. Panke Akshay Abhimanyu students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Dr. Patil Laboratory Barshi**, from 15.09.2020 to 15.10.2020.

As per our measurements and reporting structure, they are hardworking and have been excellent during the on job training.



**DR. MILIND P. PATIL**  
M.D., Pathology  
Reg.No.-62827  
DR.PATIL LABORATORY BARSHI

**Dr. Mayuri M. Patil**  
M.D.(Pathology)

**Dr. Milind P. Patil**  
M.D.(Pathology)



॥ निमंत्रण ॥

श्री शिवाजी शिक्षण प्रसारक मंडळ, बार्शी.  
श्री शिवाजी महाविद्यालय, बार्शी.



अर्थशास्त्र विभाग

व

सोलापूर विद्यापीठ अर्थशास्त्र परिषद, सोलापूर  
यांच्या संयुक्त विद्यमाने आयोजित

**विद्यार्थी शोध निबंध सादरीकरण कार्यशाळा**

प्रमुख पाहुणे व उद्घाटक

**प्रा.डॉ.सुभाष जगदंबे**

(सहाय्यक प्राध्यापक, टाटा इन्स्टिट्यूट ऑफ सोशल सायन्सेस, मुंबई)  
(तुळजापूर कॅम्पस)

कार्यक्रमाचे अध्यक्ष

**प्रा.डॉ.प्रकाश थोरात**

(प्राचार्य, श्री शिवाजी महाविद्यालय, बार्शी)

प्रमुख उपस्थिती

**प्रा.उत्तमराव हुंडेकर**  
(अध्यक्ष, सोलापूर विद्यापीठ  
अर्थशास्त्र परिषद)

**प्रा.डॉ.संग्राम चव्हाण**  
(अध्यक्ष, १५ वे वार्षिक  
अधिवेशन)

**प्रा.डॉ.राजाराम पाटील**  
(सचिव, सोलापूर विद्यापीठ  
अर्थशास्त्र परिषद)

दिनांक/वेळ

मंगळवार दि. ७ जानेवारी २०२०  
सकाळी १०.०० वा.

स्थळ

आय.सी.टी.हॉल (१४)

\* आपले विनित \*

**प्रा.एस.बी.शिंदे**  
(समन्वयक)

**प्रा.डॉ.प्रकाश थोरात**  
(प्राचार्य, श्री शिवाजी महाविद्यालय, बार्शी)





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MILKHAJI CAMERA



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## Molecular characterization of a multidrug-resistant/pandrug-resistant nosocomial polymicrobial infection with *Klebsiella pneumoniae*, *Providencia rettgeri*, and *Acinetobacter baumannii* from Rural Maharashtra, India

Dilip D. Karad<sup>1</sup>, Yogesh Somani<sup>2</sup>, Hemant Khande<sup>3</sup>, Bipin Yadav<sup>4</sup> and Arun S. Kharat<sup>4</sup>✉

<sup>1</sup>Department of Microbiology, Shri Shivaji Mahavidyalaya, Barshi, Solapur, Maharashtra, 413411, India; <sup>2</sup>Dr. Yogesh Somani Hospital, Barshi, Solapur, Maharashtra, 413401, India; <sup>3</sup>Wockhardt Research Centre, Aurangabad, Maharashtra, 431210, India; <sup>4</sup>Laboratory of Applied Microbiology, School of Life Sciences, Jawaharlal Nehru University, New Mehrauli Road, New Delhi, 110067, India

The emergence of resistance against commonly used antibiotics has become a serious global concern. The rapid development of antibiotic resistance exhibited by *Enterobacteriaceae* has caused an increasing concern regarding untreatable bacterial infections. Here, we isolated four pathogens from a geriatric female patient who was hospitalized for a month with ventilator-associated pneumonia (VAP) and fever. The organisms isolated from the tracheal aspirates and urine included *Klebsiella pneumoniae*, pandrug-resistant *Providencia rettgeri*, and *Acinetobacter baumannii*. Resistome analysis indicated that the bacterial isolates from the polymicrobial infection were multiple-drug resistant and pandrug resistant clones. Molecular characterization revealed presence of *bla*<sub>TEM-1</sub> in *K. pneumoniae*, *P. rettgeri* and *A. baumannii*. The *bla*<sub>TEM-1</sub> and *bla*<sub>NDM-1</sub> genes were present in *P. rettgeri* and *A. baumannii*, whereas the *bla*<sub>TEM-1</sub>, *bla*<sub>NDM-1</sub> and *bla*<sub>OXA-23</sub> traits were present in *A. baumannii* isolates. The patient has died due to the unavailability of effective antimicrobial treatment for this drug-resistant polymicrobial infection.

Received: 07 April, 2020; revised: 07 June, 2020; accepted: 08 June, 2020; available on-line: 31 July, 2020

✉e-mail: [arunkharat2007@gmail.com](mailto:arunkharat2007@gmail.com), [askharat@mail.jnu.ac.in](mailto:askharat@mail.jnu.ac.in)

**Acknowledgements of Financial Support:** Research Grant EEQ/2019/00521 by the Science and Engineering Research Board, Government of India to ASK is gratefully acknowledged.  
**Abbreviations:** VAP, Ventilator Associated Pneumonia; ESBL, Extended Spectrum  $\beta$ -lactamase; MDR, Multiple Drug Resistant; XDR, Extensively Drug Resistant; PDR, PanDrug Resistant; CRE, Carbapenem-resistant Enterobacteriaceae; DPS, Delayed Premonition Syndrome

### INTRODUCTION

Microorganisms that are primarily involved in antibiotic resistance are called the “ESKAPE” pathogens, and include *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *A. baumannii*, *Pseudomonas aeruginosa* and *Enterobacter species*, capable of “escaping” from commonly used antibacterial treatments (Boucher *et al.*, 2009). *A. baumannii* has emerged as a highly challenging pathogen due to its specific antibiotic resistance characteristics (Baucher *et al.*, 2009). Moreover, reports of extensively drug-resistant and pandrug-resistant *K. pneumoniae* (XDR-KP and PDR-KP) strains are increasing worldwide (Liorrelakrap *et al.*, 2010). *K. pneumoniae* is the most clinically relevant *Klebsiella* species and is responsible for >70% of infections (Hansen *et al.*, 1998). Antimicrobial resistance has become a global crisis because of escalating resistance

coupled with diminished antibiotics in the developmental pipeline. A recent report estimates that by 2050, antimicrobial resistance-related mortality will be 10 000 000/year (de Kraker *et al.*, 2016).

The rapid emergence of carbapenem-resistant *Enterobacteriaceae* (CRE) worldwide has led to the concern that these infections may be soon untreatable. Management of infections caused by *K. pneumoniae* has been complicated by antimicrobial resistance, especially that against carbapenems. Whole genome sequence analyses of six extensively drug resistant (XDR) enteric pathogens isolated at New Delhi revealed multiple mobile genetic elements that were physically linked to antibiotic resistance traits. Thus, these elements seem to be responsible for disseminating drug resistance among organisms through underlying mechanisms of horizontal gene transfer and resistance to commonly used antibiotics (Kumar *et al.*, 2017). Resistance to carbapenems in *K. pneumoniae* involves multiple mechanisms, including production of carbapenemases, such as KPC, NDM, VIM, and OXA-48-like (Johann *et al.*, 2015).

A 10-year study at Nashik, India (Odsbu *et al.*, 2018, Lokhande *et al.*, 2019), revealed a significantly higher proportion of non-susceptible and extended-spectrum  $\beta$ -lactamase (ESBL)-producing isolates from inpatients than those from outpatients for both, *Escherichia coli* and *Klebsiella* spp. A higher proportion of non-susceptible isolates indicates a great need to focus on the optimal use of antibiotics to reduce the development of antibiotic resistance.

Diverse risk factors associated with multidrug-resistance (MDR) in *A. baumannii* and other *Enterobacteriaceae* members suggest that a separate outbreak investigation should be performed in each hospital setting. Development of innovative control strategies is needed to limit the spread of these pathogens (Falagas & Kopterides, 2006).

In this study, we aimed to elucidate the mechanisms underlying drug resistance exhibited by prevalent pathogens responsible for unresponsiveness to the treatment administered to the patient. *K. pneumoniae*, *P. rettgeri*, and *A. baumannii* were isolated from the urine and tracheal aspirate of the patient on admission to the Somani Hospital, Barshi, Maharashtra, India.

### CASE PRESENTATION

A 64-year-old female patient was hospitalized in Barshi with altered behavior, history of fall, and intracranial hemorrhage; the patient was put on a ventilator. Earlier, for 4 weeks, she received treatment at the Neurology Centre in Solapur, Maharashtra, and upon stabiliza-





**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**  
( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH - India

**Prin. Dr. P. R. Thorat**  
M. Sc., Ph. D.



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : ssmbarshi@rediffmail.com

Ref. No.

Date : 01.01.2020

To,  
**Medical Officer,**  
**Dr. Jagtap Laboratory, Barshi**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Karande Sagar Vilas 2. Kale Sajjan Prakash 3. Aragade Samadhan Tanaji 4. Gawade Kian Kantilal 5. Kamble Dattatraya Saudagar students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 02.01.2020 o 02.02.2020.

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**PRINCIPAL**  
Shri Shivaji Mahavidyalaya,  
Barshi. Dist. Solapur-413411



# DR. JAGTAP LABORATORY

Dr. R. V. Jagtap M.B.B.S., D.C.P. Consulting Pathologist

'Dhanwatari Complex', Near Nagar Palika, Sulakhe Highschool Road, BARSHI - 413401. Ph.: 02184-223417, Cell : 9822340969, 8421340969

## Training Completion Certificate

This is to certify that 1. Sagar Vilas Karande 2. Kale Sajjan Prakash 3. Samadhan Tanaji Aragade 4. Gavade Kiran Kantilal 5. Kamble Dttatraya Soudagar students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Dr. Jagtap Laboratory, Barshi**, from 02.01.2020 to 02.02.2020.

As per our measurements and reporting structure, they are hardworking and have been excellent during the onjob training.

  
Dr. Jagtap Laboratory  
Dr. R.V. Jagtap  
M.B.B.S., D.C.P. (Consulting Pathologist)  
Reg.No: 64057

• NABL Accredited Laboratory and ICMR Approved • Certificate No.: MC-4835

• Covid-19 RTPCR and other RTPCR available

• Biochemistry on Fully Automated Biochemistry Analyser (Italy) • Total Hormone Assay on Fully Automated Immuno Analyser Mini Vidas (France) • Hemogram on Fully Automated Cell Counter Bechman Coulter (U.S.A.) • Electrolyte on Automated base Analyser (Na,K,Li,Ci) • HIV DUO + Western Blot Assay (USA) • SLE (ANA) Profile Coagulation Test On Fully Automated Coagulometer • Histopathology, Cytology Microbiology - Bact Alert / Vittek 2 (France) • Genotype MTB-DR for Tuberculosis • Other Special Test Under One Roof



Madha Taluka Shikshan Prasarak Mandal's

**K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College,  
Vidyanagar, Bhosare.**

Paranda Road, Kurduwadi Tal-Madha Dist-Solapur Pin-413 208 (Maharashtra)

E-mail :- knbacck@yahoo.co.in

Phone No. :- (02183)223245

Fax No. :- (02183)223245

No. KNBACCK/ 1587 / 2019

Date: 4/10/2019

To,  
**Dr. V. M. Gurame**  
Assistant Professor,  
Department of Chemistry,  
Shri. Shivaji Mahavidyalaya, Barshi.

**Subject :** Regarding invitation for guest lecture on Career  
Opportunities in Chemistry dated on 4<sup>th</sup> September 2019.

Dear Sir,

The department of chemistry from our college wants to organize a guest lecture on Career Opportunities in Chemistry. We would like to hear your ideas on the given topic. The major aim of guest lecture is to motivate and inculcate the interest of Chemistry in degree students.

It's humble request to accept the invitation.

Thank you.

*N. N. Patil*  
Principal

K. N. Bhise Arts, Comm. & Vinayakrao  
Patil Science College,  
Vidyanagar Bhosare, Dist. Solapur

Madha Taluka Shikshan Prasarak Mandal's  
**K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College,**  
**Vidyanagar, Bhosare.**

Paranda Road, Kurduwadi Tal-Madha Dist-Solapur Pin-413 208 (Maharashtra)

E-mail :- knbacck@yahoo.co.in

Phone No. :- (02183)223245

Fax No. :- (02183)223245

No. KNBACCK/1587/2019

Date : 04/09/2019

To,  
**Dr. V. M. Gurame**  
Assistant Professor,  
Department of Chemistry.  
Shri. Shivaji Mahavidyalaya, Barshi.

**Subject: Appreciation Letter.**

Dear Sir,

We are very much thankful to you for accepting and remains present in our college as a chief guest for inauguration of Chemistry study association dated on 4<sup>th</sup> September 2019.

Our students are undoubtedly benefited out of the interaction they had with you after your motivational speech.

On behalf of our institution, I take this opportunity to express indebtedness for ever cooperation and active help.

Thanks and regards.

  
Principal

K. N. Bhise Arts, Comm. & Vinayakrao  
Patil Science College,  
Vidyanagar Bhesare, Dist. Solapur

Students participating in Field work at Vaishnavi Agro products Barshi



Students participating in Field work at Sanghavi Quality Products Pvt. Ltd Barshi





## **MANODEEP INSTITUTE OF NEUROPSYCHIATRY & BEHAVIORAL SCIENCES**

Kurduwadi Road, Barshi. Dist. Solapur. ☎ : Mob. 9822355645, 9075353926

**Dr. Krishna Mastud**  
Neuropsychiatrist

**Dr. Varsha Mastud**  
Psychotherapist

Time : 11 pm to 2 pm & 3.30 pm to 5 pm

**SUNDAY CLOSED**

Date : / /20

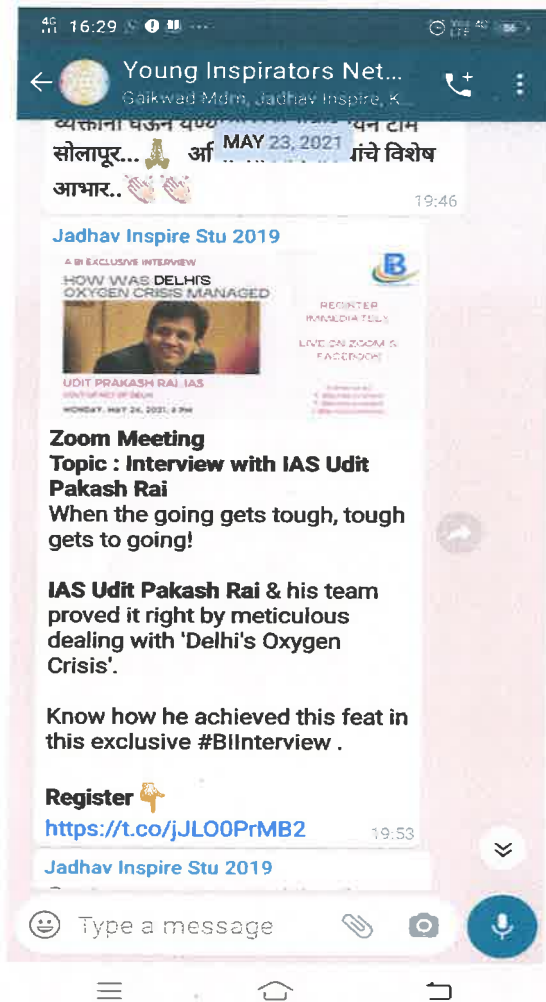
### **Training Completion Certificate**

This is to certify that 1. Muthal Nikita Navnath 2. Zalte Trupti Yashwant 3. Kolhe Neha Nagnath 4. Landage Rohini Chaitanya 5. Dhanke Durga Maruti students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Manodip Institute of Neuropsychiatric and Behavioral Sciences, Barshi**, from 10.11.2019 to 10.12.2019.

As per our measurements and reporting structure, they are hardworking and have been excellent during the on job training.

  
**Dr. Krishna Mastud**  
M.D.(Psy.)  
Reg.No.- 69192  
**Manodeep Institute, Barshi.**

## Interview with IAS Udit Pakash Rai





**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**

( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH – India

**Prin. Dr. P. R. Thorat**  
M. Sc., Ph. D.



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : [ssmbarshi@rediffmail.com](mailto:ssmbarshi@rediffmail.com)

Ref. No.

Date : 01.10.2019

To,  
**Medical Officer,**  
**Bhagwant Blood Bank Barshi,**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Pingale Sudam Dnyandeo 2. Lawand Ajay Suresh 3. Ghadage Sagar Bhimrao 4. Yadav Sheetal Sukhedev students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 02.10.2019 to 02.11.2019.

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**PRINCIPAL**  
Shri Shivaji Mahavidyalaya,  
Barshi, Dist. Solapur-413411



F.D.A. Lic No.:PD/90

# *Sri Bhagwant Blood Centre*

1st Floor, Dr.Lamkane Building, Near Kurduwadi Naka,  
Barshi - 413 411 Dist-Solapur(M.S.) Tel : 02184-222655

Chairmen : Shashikant R. Jagdale - Mob: 9371119449



Ref.No.

Date : / /20

## Training Completion Certificate

This is to certify that 1. Pingale Sudam Dnyandeo 2. Lawand Ajay Suresh  
3. Ghadage Sagar Bhimrao 4. Yadav Sheetal Sukhedev students of Shri Shivaji  
Mahavidyalaya, Barshi has successfully completed On Job training for a period  
of 30 days with **Bhagwant Blood Bank, Barshi**, from 02.10.2019 to  
02.11.2019.

As per our measurements and reporting structure, they are hardworking  
and have been excellent during the on job training.

  
**Shri Bhagwant Blood Centre**  
**Barshi-413411**



## Training Completion Certificate

This is to certify that 1. Momin Alfiaya Riyaj 2. Maradkar Shruti Sunil 3. Muthal Supriya Rajaram students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **SANGHVI QUALITY PRODUCTS PVT LTD BARSHI**, from 02.10.2019 to 02.11.2019.

As per our measurements and reporting structure, they are hardworking and have been excellent during the on job training.

Sanghvi Quality Products Pvt.Ltd.



Authorised Signatory



Training of Community College Student at Sanghavi Quality Products Pvt. Ltd Barshi





# VAISHNAVI AGRO PRODUCTS

Mfg. TAMRIND SEED PAPPU & KARNEL POWDER

FACT.: Gat No. 88/3/2/1, At Post Bhoiare, Tal. Barshi, Dist. Solapur

Office Address- 69, Market Yard ,Barshi-413401

Email:-bagmar47@rediffmail.com Phone : (02184)226047,226357

DATE :

## Training Completion Certificate

This is to certify that 1. Bhoite Madhuri Balasaheb 2. Jadhaver Anuja Suresh 3. Gilbile Nikita Balasaheb 4. Patil Padmaja Ajay 5. Gaware Durga Chandrakant students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with **Vaishnavi Agro Products, Barshi**, from 10.11.2019 to 10.12.2019.

As per our measurements and reporting structure, they are hardworking and have been excellent during the on job training.



For Vaishannavi Agro Products

*P. D. Bagmar*  
Proprietor



**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**  
( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH - India

**Prin. Dr. P. R. Thorat**  
M. Sc., Ph. D.



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : [ssmbarshi@rediffmail.com](mailto:ssmbarshi@rediffmail.com)

Ref. No.

Date : 20.09.2019

To,  
**Hon. Secretary,**  
**Shriman Rambhai Shah Blood Centre, Barshi**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1. Burgute Poonam Vijay 2. Patil SURaj Nagnath 3. BIDve Prajкта Prabhakar 4. Gavli Varsha Rajendra students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 22.09.2019 to 22.10.2019.

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**PRINCIPAL**  
Shri Shivaji Mahavidyalaya,  
Barshi. Dist. Solapur-413411





Indian Red Cross Society, Sub Branch Barshi

Licence No. PD/31

# Shriman Rambhai Shah Blood Centre, Barshi

Red Cross Bhavan, Jawaharlal Hospital Compound, Barshi -413 401, Dist. Solapur

☎: (02184) 222399, 222499, E-mail : srsbloodbank@gmail.com

Chairman  
Dr. V.J. Nimkar

Vice. Chairman  
Mr. A.S. Kunkulol

Hon. Secretary  
Dr. D.D. Karad

Hon. Treasurer  
Mr. A.S. Dahale

Cheif. Medica Officer  
Dr. R.V. Jagtap

## Training Completion Certificate

This is to certify that 1. Burgute Poonam Vijay 2. Patil SUuraj Nagnath 3. Bidve Prajkta Prabhakar 4. Gavli Varsha Rajendra students of Shri Shivaji Mahavidyalaya, Barshi has successfully completed On Job training for a period of 30 days with Shriman Rambhai Shah Blood Bank, Barshi from 22.09.2019 to 22.10.2019.

As per our measurements and reporting structure, they are hardworking and have been excellent during the On job training.



  
IRCS Shriman Rambhai Shah  
Blood Centre, Barshi  
Jawahar Hospital Compound  
Barshi - 413 401.  
Ph. No. - 222399

Students participating in Field work at Shriman Rambhai Shah Blood bank





**Shri Shivaji Shikshan Prasarak Mandal, Barshi's**  
**Shri Shivaji Mahavidyalaya, Barshi.**

( Arts & Science - Junior & Senior )

Post Box - 4, A/P Barsi - 413411,  
Dist. - Solapur, MH – India

**Prin. Dr. P. R. Thorat**  
M. Sc., Ph. D.



☎ Off. : (02184) 222382 • Fax : (02184) 222382 • E-Mail : ssmbarshi@rediffmail.com

Ref. No.

Date : 8-11-19

To,  
**Medical Officer,**  
**Manodip Institute of Neuropsychiatric and Behavioral Sciences**  
**Barshi,**  
**Dist Solapur.**

**Sub: On Job Training for the Students of Shri Shivaji Mahavidyalaya, Barshi.**

Sir,

With reference to the above mentioned subject, we are sending, 1Muthal Nikita Navnath 2. Zalte Trupti Yashwant 3. Kolhe Neha Nagnath 4. Landage Rohini Chaitnya 5. Dhakne Durga Maruti students of Shri Shivaji Mahavidyalaya, Barshi for on job training in your esteemed laboratory during 10.11.2019 to 10.12.2019

Please do the needful regarding this on job training and oblige.

Thanking You.

  
**PRINCIPAL**  
Shri Shivaji Mahavidyalaya,  
Barshi. Dist. Solapur-413411





# An Efficient Protocol for the Synthesis of Pyrido[2,3-*d*]pyrimidines in Glycerol–Water Medium: Assessment by Green Chemistry Metrics

Dattatraya K. Jamale, Vashishtha M. Gurame, Navanath J. Valekar, Shankar P. Hangirgekar, Govind B. Kolekar, and Prashant V. Anbhule\*

A clean and ecofriendly approach for the catalyst-free synthesis of pyrido[2,3-*d*]pyrimidine derivatives by one-pot three-component condensation of aromatic aldehyde, malononitrile and 6-aminouracil or 6-amino-1,3-dimethyluracil using glycerol–water (3:1) as green reaction media has been developed. Catalyst-free synthesis with high to excellent yields and use of glycerol–water system as an environmentally benign reaction condition are the prominent features of this strategy. Moreover, excellent outcomes from the calculations of green chemistry metrics reveal the greenness of the protocol.

## 1. Introduction

Over the past few years, awareness of environmentally benign chemistry has become a significant vision to encourage sustainable development in academia and industrial research.<sup>[1]</sup> Green Chemistry is defined as “the invention, design, and application of chemical products and processes to reduce or to eliminate the use and generation of hazardous substances.”<sup>[1]</sup> In addition, exclusion of catalysts and replacement of harmful solvents by comparatively benign solvents for chemical reactions is an admirable approach of green chemistry principles.<sup>[1]</sup> Catalysts used in synthetic protocols may be harmful to environment, therefore, the development of catalyst-free chemical procedures is an important defy in organic synthesis. Moreover, by considering the impact of waste from chemical laboratories and industries on the environment, search for green solvents has become a focus of intensive research in organic transformations, and consequently solvent selection is a crucial feature in ecofriendly chemical processes.<sup>[2]</sup> In fact, water is the first preference, but its utility

is limited due to less solubility of many organic compounds in water. At the present time, the awareness to use biomass-derived solvents rather than traditional organic solvents has improved.<sup>[3]</sup> With regard to the green chemistry principles, the biomass-derived glycerol<sup>[4]</sup> is a “green solvent”<sup>[1]</sup> and also considered as “organic water”<sup>[5]</sup> owing to its promising properties like nontoxicity, biodegradability, nonvolatility, noncorrosiveness, inflammability, and inexpensiveness.<sup>[6]</sup> It is a polar protic solvent, which has capability to form strong hydrogen bonds and many organic

compounds are easily dissolved in glycerol that are not or less soluble in water.<sup>[6]</sup> As a consequence of these encouraging properties, in recent years many synthetic strategies have been effectively carried out by using glycerol as a promising reaction medium.<sup>[7,8]</sup>

The expansion of clean and efficient synthetic strategies for the design of pharmacologically important nitrogen containing heterocycles and their fused derivatives is a significant aspect of medicinal and organic chemistry.<sup>[9]</sup> From last two decades, a great deal of consideration has been intended for synthesis of pyrido[2,3-*d*]pyrimidine derivatives due to their attractive biological and pharmacological properties such as antibacterial,<sup>[10]</sup> antimicrobial,<sup>[11]</sup> analgesic,<sup>[12]</sup> anti-inflammatory,<sup>[13]</sup> antitumor,<sup>[14]</sup> cardiotoxic,<sup>[15]</sup> antifungal,<sup>[16]</sup> antihypertensive,<sup>[17]</sup> and calcium channel antagonists.<sup>[18]</sup> Consequently, a number of synthetic approaches have been reported for the preparation of pyrido[2,3-*d*]pyrimidine derivatives.<sup>[19–22]</sup> Moreover, the literature survey reveals that pyrido[2,3-*d*]pyrimidines are usually synthesized by condensation of aromatic aldehyde, malononitrile, and 6-aminouracil or its derivatives at different reaction conditions such as 1) tetra-*n*-butyl ammonium bromide (TBAB)/ultrasonic irradiation/water/70 °C/50 min;<sup>[23]</sup> 2) triethylbenzylammonium chloride (TEBAC)/water/90 °C/6–10 h;<sup>[24]</sup> 3) nanocrystalline MgO/water/80 °C/12–35 min;<sup>[25]</sup> 4) KF·Al<sub>2</sub>O<sub>3</sub>/ethanol/90 °C/5–8 h;<sup>[26]</sup> 5) diammonium hydrogen phosphate (DAHP)/water-ethanol/reflux/2 h;<sup>[27]</sup> 6) DMF/reflux/20–30 h;<sup>[28]</sup> 7) NaBr/ethanol or acetonitrile/electrolysis/25–30 min;<sup>[29]</sup> 8) SBA-1T-SO<sub>3</sub>H/solvent free/5–15 min;<sup>[30]</sup> 9) Al-HMS-20/ethanol/RT/12 h;<sup>[31]</sup> and 10) thiamine hydrochloride/water/90 °C/2–2.5 h.<sup>[32]</sup>

By considering the pharmacological significance of pyrido[2,3-*d*]pyrimidines and within the framework of green chemistry

D. K. Jamale, V. M. Gurame  
Chemistry Research Laboratory  
Department of Chemistry  
Shri Shivaji Mahavidyalaya  
Solapur, Maharashtra, India

N. J. Valekar, S. P. Hangirgekar, G. B. Kolekar, P. V. Anbhule  
Medicinal Chemistry Research Laboratory  
Department of Chemistry  
Shivaji University  
Kolhapur, Maharashtra, India  
E-mail: pvanbhule@gmail.com

DOI: 10.1002/masy.201800202



# Glycerol Mediated Synthesis, Biological Evaluation, and Molecular Docking Study of 4-(1*H*-pyrazol-4-yl)-polyhydroquinolines as Potent Antitubercular Agents

Dattatraya K. Jamale,<sup>a</sup> Santosh S. Undare,<sup>b</sup> Navanath J. Valekar,<sup>c</sup> Aniket P. Sarkate,<sup>d</sup> Govind B. Kolekar,<sup>c</sup> and Prashant V. Anbhule<sup>c\*</sup>

<sup>a</sup>Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi, Shivaji Nagar, Barshi, Maharashtra, India

<sup>b</sup>Department of Chemistry, Balbhim College of Arts, Science and Commerce, Beed, Dist Beed, Maharashtra, India

<sup>c</sup>Medicinal Chemistry Research Laboratory, Department of Chemistry, Shivaji University, Kolhapur, Vidyanagar, Kolhapur, Maharashtra, India

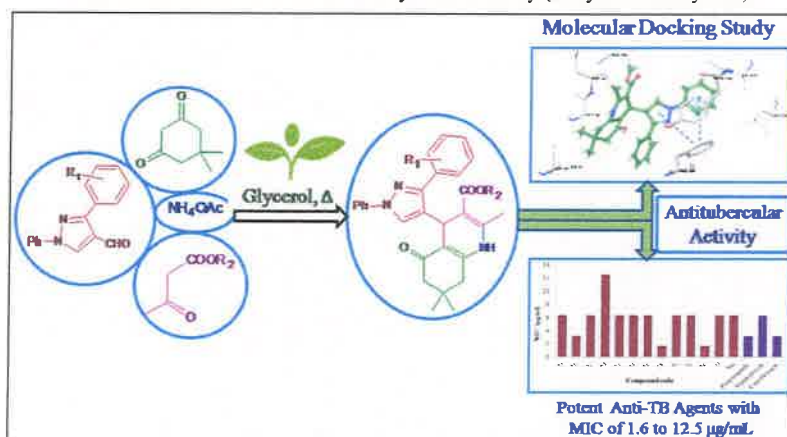
<sup>d</sup>Department of Chemical Technology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Jaisingpura, Aurangabad, Maharashtra, India

\*E-mail: pvanbhule@gmail.com

Received September 13, 2018

DOI 10.1002/jhet.3438

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A series of 4-(1*H*-pyrazol-4-yl)-polyhydroquinolines were synthesized through one-pot four-component Hantzsch condensation of 1,3-diphenyl-1*H*-pyrazole-4-carbaldehydes, ammonium acetate, dimedone, and alkyl acetoacetate in glycerol as a green reaction medium. The structures of the compounds are verified by spectroscopic methods and screened for their antimicrobial activity against *Mycobacterium tuberculosis* H37RV strain. Almost all the synthesized derivatives reveal excellent antitubercular activity based on minimum inhibitory concentration. Especially the compounds **5h** and **5k** exhibit outstanding antitubercular activity with minimum inhibitory concentration 1.6  $\mu\text{g/mL}$ . In addition, molecular docking study of synthesized scaffolds against enoyl-acyl carrier protein reductase from *M. tuberculosis* was performed to propose the binding modes.

*J. Heterocyclic Chem.*, 00, 00 (2018).

## INTRODUCTION

Tuberculosis (TB) is the most worrying infectious disease in the world owing to its high mortality and morbidity and consequently declared as a serious global health emergency by World Health Organization [1]. It is one of the oldest and an incredibly widespread disease caused by the pathogen *Mycobacterium tuberculosis* and is still a foremost peril to human being [2]. Recently, it has been documented that approximately one third of global population is infected with this most dangerous pathogenic microorganism, and particularly, in several developing countries, it is not easy to control this dangerous dreadful infection [3]. The first-line drugs like ethambutol, pyrazinamide, isoniazid, and rifampicin are

easily accessible in market and commonly used in treatment of TB. Even though, in the report of World Health Organization, it has been estimated that in 2016, 10.4 million new TB affected persons were accounted, and around 56% people were died due to this disease especially in developing countries such as India, Indonesia, China, the Philippines, and Pakistan [1]. Furthermore, about 4.9 lakh new infected people of multidrug-resistant TB and an additional 1 lakh patient with rifampicin-resistant TB were found in 2016 [1]. Generally, an investigation for the development of potent anti-tubercular (anti-TB) drugs has been paying attention on the construction of molecules having enzyme inhibitory property. The enzyme enoyl-acyl carrier protein (enoyl-ACP) reductase is needed for fatty acid elongation in the

Training of Community College Student at Laxmi Sopan Agriculture Produce Marketing Company Ltd.Barshi



Principal Dr. P. R. Thorat inaugurating the conference at DAV College Lalitpur, Nepa



Principal Dr. P. R. Thorat delivering talk at DAV College Lalitpur, Nepal



Principal Dr. P. R. Thorat Signing MOU with Balkumari College Kathmandu, Nepal



Principal Dr. P. R. Thorat delivering talk at Balkumari College Kathmandu, Nepal







SHRI SHIVAJI SHIKSHAN PRASARAK MANDAL, BARSHI'S

**SHRI SHIVAJI MAHAVIDYALAYA, BARSHI**  
(Arts and Science-Junior & Senior)

Post Box No. 8 At.Post : Barshi-413411 Dist: Solapur (M.S)

NAAC Re-accredited "A" Grade

Prin.Dr. Prakash Thorat, M.Sc.M.Phil,Ph.D.



Office: (02184) 222382 ● Fax : (02184) 222382 E-mail : ssmb\_barshi@rediffmail.com

Out.No.. SSMB/Sr./ 288

Date 13 - 06 -2018

To,  
Medical Officer,  
Bhagwant Blood Bank,Barshi.  
Barshi,Dist-Solapur.

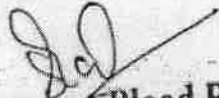
**Sub:- On Job Training for the students of Medical Lab  
Assistant of community college.**


Sir,

With reference to the above mentioned,we are sending,

Miss/Mr. 1) Panasare Rukmini Mahadeo 2) Gavhane Gayatri Anil  
3) Sayyad Rukkaiya Yusuf 4) Saudagar Shobha Babruvan, the  
student of diploma in Medical Laboratory Assistant of our college for on  
Job Training in your esteemed Laboratory during 20/06/2018 To  
20/07/2018. Please do the needful regarding this on Job Training and  
oblige.

Thanking you.

  
Sri Bhagwant Blood Bank  
Barshi- 413411

  
PRINCIPAL  
Shri Shivaji Mahavidyalaya,  
Barshi, Dist. Solapur-413411.