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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 a, Panchsheela A. Ubale b, kailas D. Sonawane a, Nitin M. Naik d, Mohd Afzal a, Lahu A. Ghule a, Sachin A. Deodware a, Kundalkesha D. Gaikwad a, Umesh B. Barache a, Shashikant H. Gaikwad a,

- Chemistry Research Laboratory, Department of Chemistry, Stat Shivaji Mahavidyalaya, Barshi 413 401, Maharashtra, India
- Department of Chemistry, N.K. Orchid College of Engineering and Technology, Solapur 413 001, Maharashtra, India
- Department of Blochemistry, Structural Bioinformatics Unit, Shivaji University, Kolhapur 416 004, Maharashtra, India
- <sup>d</sup> Department of Microbiology, Shivaji University, Kolhapur 416 004, Maharashtra, India
- Department of Chemistry, College of Science, King Saud University, Rtyadh 11451, Saudi Arabia
- Department of Chemistry, R.D. and S.H. National College and S.W.A. of Science College, Bandra (W), Mumbal 400050, Maharashtra, India

#### ARTICLE INFO

#### Keywords: Schiff base 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-IH-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\_ubalc@rediffmail.com (P.A. Ubale), rasayanshg@gmail.com (S.H. Gaikwad).

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# M/s. Yogesh Industries

Mfg. of Packaged Drinking Water

Fact:-9,10, Industrial Estate No. 1, Agalgaon Road, Barshi - 413 401 Dist.-Solapur Off:-27, Jawahar Market Yard, P. Box No. 12, Barshi - 413 401 Dist. - Solapur © (02184) - 222761 Mo.: 9422644171, 9422644172 E mail: dilipsomani6@gmail.com

## **CERTIFICATE**

Date

This is to certify Miss. Dipali Shrirang Bharate has satisfactorily completed an "Industrial Training" (OJT) in yogesh Industries Motirich Aqua, Barshi From 7" 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

Forwarded through

Head,

Department of Chemistry,

Shri Shivaji Mahavidyalaya, Barshi





Examiner



# M/s. Yogesh Industries

Mfg. of Packaged Drinking Water

Fact: 9,10, Industrial Estate No. 1, Agalgaon Road, Barshi - 413 401 Dist - Solapur Off: - 27, Jawahar Market Yard, P. Box No. 12, Barshi - 413 401 Dist. - Solapur ☎ (02184) - 222761 Mo.: 9422644171, 9422644172 E mail : dilipsomani6@gmail.com

## CERTIFICATE

Date

This is to certify Miss. Pratiksha Maruti Narvade has satisfactorily completed an "Industrial Trainiing "(OJT) in yogesh Industries Motirich Aqua, Barshi From 7" 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:

ojèct Guide

Ass. Prof. Dr. U. B. Barache

Forwarded through

Head,

Department of Chemistry,

Shri Shivaji Mahavidyalaya, Barshi





Examiner



#### ANNEXURE III



## PROFORMA DRAFT OF MOU BETWEEN MENTOR AND MENTEE INSTITUTION

MENTOR MENTEE SCHEME (PARIS-SPARSHA YOJANA)

MEMORANDUM OF UNDERSTANDING (MoU) BETWEEN NAME OF MENTOR INSTITUTION

SHRI SHIVAJI MAHAVIDYALAYA, BARSHI

NAME OF MENTEE INSTITUTION COLLEGE OF EDUCATION, BARSHI

FOR

Improving Overall Excellence of Mentee Institution in Teaching Learning and Evaluation

Guidance & Support for Assessment and Accreditation Process





## MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding (hereinafter called as the 'MoU') is entered into on this 4th day of November Name of Month – Two Thousand and Twenty Three (Date in Numerals 04/11/2023), by and between

Shri Shivaji Mahavidyalaya Barshi, the First Party represented herein by its PRINCIPAL / TRUSTEE (hereinafter referred as 'First Party', the institution which expression, unless excluded by or repugnant to the subject or context shall include its successors – in-office, administrators and assigns).

#### AND

College of Education, Barshi, the Second Party, and represented herein by its, PRINCIPAL/COORDINATOR / Name of Competent Authority / Representative, (hereinafter referred to as "Second Party", which expression, unless excluded by or repugnant to the subject or context shall include its successors – in-office, administrators and assigns).

(First Party and Second Party are hereinafter jointly referred to as 'Parties' and individually as 'Party') as

### WHEREAS:

- A) Shri Shivaji Mahavidyalaya Barshi –, the First Party is a Higher Educational Institution affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur Name of the University Government aided by State Government.
- B) College of Education, Barshi -, the Second Party is a Higher Educational Institution affiliated to Punyashlok Ahilyadevi Holkar Solapur University, Solapur Name of the University Government aided by State Government.
- C) First Party & Second Party believe that collaboration and co-operation between themselves will promote more effective use of each of their resources, and provide each of them with enhanced opportunities.
- D) The Parties intent to cooperate and focus their efforts on cooperation in overall excellence in teaching learning and evaluation
- E) Both Parties, being legal entities in themselves desire to sign this MOU for advancing their mutual interests.



Education

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NOW POST OF THE MUTUAL UNDERSTANDING SEASONS FORTH IN THIS MOU, THE PARTIES HERE TO AGREE AS FOLLOWS:

## CLAUSE 1: CO-OPERATION

Both Parties are united by common interests and objectives, and they shall establish channels of communication and co-operation that will promote and advance their respective operations within the Institution and its related wings. The Parties shall keep each other informed of potential opportunities and shall share all information that may be relevant to secure additional opportunities for one another.

First Party and Second Party co-operation will facilitate effective utilization of the intellectual capabilities of the faculty of First Party providing significant inputs to Second Party in developing suitable teaching / training systems, keeping in mind the needs of the region of Mentee Institution.

The general terms of co-operation shall be governed by this MOU. The Parties shall cooperate with each other and shall, as promptly as is reasonably practical, enter into all relevant agreements, deeds and documents (the 'Definitive Documents') as may be required to give effect to the actions contemplated in terms of this MOU. The term of Definitive Documents shall be mutually decided between the Parties. Along with the Definitive Documents, this MOU shall represent the entire understanding as to the subject matter hereof and shall supersede any prior understanding between the Parties on the subject matter hereof.

## CLAUSE 2: SCOPE OF THE MoU

The budding graduates from the institutions could play a key role in, excellence innovation and competitiveness. Both parties believe that close co-operation between the two would be of major benefit to the student community to enhance their knowledge.

Curriculum Design: First Party will give valuable inputs to the second Party in teaching / training methodology and suitably customization of the curriculum so that the students fit into the industrial scenario of their region meaningfully.

Training & Visits: Interaction amongst the teachers and students of both institutions will give an insight in to the latest developments / requirements of the higher education; the First Party to permit the Faculty and Students of the Second Party to visit its institutional facilities and also involve in training programs about teaching, learning and evaluation for the Second Party. The training and exposure provided to students and faculty through this association will build confidence and prepare the students to have a smooth transition from there rural background to working career. The First Party will provide its labs / workshops / libraries for



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the hands-on training of the learners of the Second Party as per the availability of the facilities.

Research and Development: Both Parties have agreed to carry out the joint research activities in the fields of -

- 1. Research Workshops
- 2. Conferences & Seminars
- 3. Research papers & Book Publications
- 4. Ph D Course Work Workshop
- 5. Reference books

Capacity development Programs: First Party to train the students and teachers of second Party on the emerging trends in higher education in order to bridge the skill gap and make them industry ready.

Guest Lectures: First Party to extend the necessary support to deliver guest lectures to the students of the Second Party (inter alia, by video conferencing) on the relevant topics/ trends and in house requirements.

Faculty Development Programs: First Party to train the Faculties of Second Party for imparting training, in new pedagogies, innovative assessment and research methodology and other relevant topics.

Placement of Trained Students: First Party will actively engage to help the delivery of the soft skills and support in placement of students of the Second Party.

Guidance on Assessment and Accreditation Process: First Party will provide Guidance on Assessment and Accreditation Process by arranging Seminars/Workshops/Visits. They will also guide on NAAC process, Documentation required, Role of IQAC in quality enhancement of the institution leading to completion of NAAC process.

Funding: The funding for the Scheme shall be followed as mention in the Mentor-Mentee Guidelines prepared by the State Government. First Party and Second Party as joint venture will be raising the required funds through Institutional Social Responsibility (ISR) or Corporate Social Responsibility (CSR).

#### **CLAUSE 3: REPORTING**

Both parties will submit monthly /quarterly report to District Level Committee, University Level Committee, Director, Technical Education and RUSA (Maharashtra) about the activities







## CLAUSE & VALIDITY

This Agreement will be valid antil it is expressly terminated by either Party on mutually agreed terms and prior written permission from the competent authority of university during which period College of Education, Barahi, the Second Party, as the case may be, will take effective steps for implementation of this MOU.

Both Parties may terminate this MOU upon 30 calendar days' notice in writing. In the event of termination, both parties must discharge their obligations

Any divergence or difference derived from the interpretation or application of the MoU shall be resolved by arbitration between the parties as per the Arbitration Act, 1996. The place of the arbitration shall be at District Head Quarters of the First Party. This undertaking is to be construed in accordance with Indian Law with exclusive jurisdiction in the Courts of Barshi.

CLAUSE 5: DURATION OF MOU

Duration of MoU shall be of minimum one year or till the completion of NAAC process of Second Party.

AGREED ON THIS 4th DAY OF November 2023:

Name of Menter Institution

Shri Shivaji Mahavidyalaya, Barshi

Name Mentee Institution

College of Education, Barshi

VC. PRINCIPAL Mari Shivoji Mahavidyalaya, BaroM

Authorized Signatory

Principal
College of Education, Barahl
DKt Selection 17417

Shri Shivaji Mahavidyalaya, Barshi	College of Education, Barshi
725 G Shivaji Nagar, Bacshi	725 G Shivaji Nagar, Barshi
9822487107	02184-222569, 9850368385
Ssmb_barshi@rediffmail.com	bedbarshi@yahoo.com
www.samburshi.org.iu	http://www.cocbarshi.org.in/

Witness

Vitness 2.

CDr. V.M. Gusames

Witness 1: Tomb.

Witness 27 (prof. Dr. Kumsle. A.9)

# MEMORANDUM OF UNDERSTANDING

## BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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# Anekant Automatic System, Barshi

Prin. Dr. B. D. Revadkar Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur

Vivek Dharmarao 439, Kasarda Galli, Kasaba Peth Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Anekant Automatic System, Barshi

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for Five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Shri Shiveji Mahavidyalaya, Barshi

Vivek Dharmarao

Dr. B. D. Revadkar

Date: 17: July 2022



# MEMORANDUM OF UNDERSTADING

This **MEMORANDUM OF UNDRESTADING** (herein after referred to as "MoU") is executed on this Day 9<sup>th</sup> of April 2022 at Shri Shivaji Mahavidyalaya, Barshi.

## BETWEEN

Shri Shivaji Mahavidyalaya, Barshi, is accredited and reaccredited with A grade by NAAC and serves for excellence in quality education for rural and poor students. It is accorded with *STAR* status by DBT, GOI and DST-FIST status and is awarded with Best College by Punyashlok Ahilyadevi Holkar Solapur University, Solapur (First Party).

## AND

M/s. Darshana Pulses, Barshi is a private company incorporated located at Tuljapur Road, Barshi (Second Party).

## 1. Scope

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We believe that for providing a better platform for students and stake holder including students from the university campus school, departments / center of institution and also the students from the various affiliated colleges / institutions and also the students from the autonomous college / institution etc. within the jurisdiction of this university to give better opportunities in various fields of education and interdisciplinary research etc. the collaboration and co-operation between themselves will promote more effective use of each of their resources, and provide each of them with enhanced opportunities.

## 2. Objectives of the MoU

The general objective of this Memorandum of Understanding (MOU) is to stimulate and facilitate the development of collaborative and mutually beneficial processes and technology transfer with respect to oil



technologies and downstream processing of oil products in industries.

### 3. Areas of collaboration

Production, Quality control, Quality Assurance, Research & Development (R & D).

## 4. Proposed modes of collaboration

Academic members of staff and other personnel of one partner in situation may spend periods not normally exceeding one Week in the other partner institution. In supporting such an arrangement, the home institution undertakes to continue the salary of the participant. All other financial matters, including travel costs, are subject to individual negotiation, and will normally be the responsibility of the persons involved and their home institution.

#### 5. Terms and Conditions

- 1. All activities shall be executed only after written consent. of both the parties.
- 2. The Memorandum signed will be the guiding document for both the parties for execution of the actions and initiatives in the near future. Both the organizations will encourage its members to define the overall strategy and roadmap to carry out the action points contained in it and report on the progress achieved at regular intervals.
- 3. During the signing ceremony, **Prof. A.B. Shaikh**, **Principal**, **Shri Shivaji Mahavidyalaya**, **Barshi** welcomed the proposal and said that the industry would nurture academic and research interest among students.
- 4. Mr. Dilip S. Gandhi, Owner, M/s. Darshana Pulses, Barshi said that the company is also excited and looks forward for a fruitful association with Shri Shivaji Mahavidyalaya, Barshi. He added all possible help with regards for beneficial value addition to both the giants for a winwin situation.



- 5. The signing-off ceremony ended with a note to make this initiative as a role model for Academic -Industry Linkages.
- 6. The aim of the Memorandum of Understanding shall be to achieve a broad balance in the respective contributions and benefits of the collaboration, and this shall be subject to periodic review by these organizations.
- 7. Academic members of staff and other personnel of one partner in situation may spend periods not normally exceeding one Week in the other partner institution. In supporting such an arrangement, the home institution undertakes to continue the salary of the participant. All other financial matters, including travel costs, are subject to individual negotiation, and will normally be the responsibility of the persons involved and their home institution.
- 8. The host institution agrees to assist in the seeking of appropriate housing, and to supply work space, library and technical facilities as appropriate.
- 9. In the implementation of specific cooperative programs, a written agreement covering all relevant aspects including funding and the obligations to be undertaken by each party will be negotiated, mutually agreed and formalized in writing, prior to the commencement of the program.
- 10.Shri Shivaji Mahavidyalaya, Barshi shall not hold M/s. Darshana Pulses, Barshi liable for any damage that is caused. Whether directly or indirectly, by M/s. Darshana Pulses, Barshi and vice versa.
- 11. Shri Shivaji Mahavidyalaya, Barshi will indemnify any loss suffered by M/s. Darshana Pulses, Barshi that is caused. Whether directly or indirectly and vice versa.



- 12.All these Organizations /departments on their respective websites will mention this Partnership/ collaboration and it be mentioned in the right context.
- 13. The necessary secreey of the work will be taken care by both the organizations/implementing Department of the organization.
- 14. The contract will be governed by the rules, regulations & laws of Govt. of India, UGC, Government of Maharashtra and the Punyashlok Ahilyadevi Holkar Solapur University, Solapur.
- 15. There will be a coordinating committee consisting of the Principals and heads of respective organizations. Additional members will be included as per the need.
- 16. This agreement will take effect from the date of its signing and shall be valid for an unlimited period from that date unless sooner terminated, revoked or modified by mutual written agreement between tile Parties, and may be extended by mutual written agreement.
- 17. Either party may terminate the Agreement at any time during tile term by the provision of three months written notice to the other party.

## 5. Financing

This MoU does not confer any financial liability on any of the parties to this MoU. The activities which require financial assistance shall be decided by mutual consent of both the Parties and shall be initiated only after written agreement to this effect which includes financial contributions of all or any of kinds and specifying the sharing of profit if any.

## 6. Nomination of Coordinators

Prof. S.H. Gaikwad,
Head of Department,
Department of Chemistry,
Shri Shivaji Mahavidyalaya,
Barshi.



## 7. Arrangements for visiting officials

## 8. Use of Names

Except in promoting the activities proposed in Article 1.1 above among its faculty, staff, and students, neither Participant may use the name of the other Participant in any form of advertising or publicity without express written permission. seek permission from one another by submitting the proposed use, well in advance of any deadline, also any activity for which the certificate and or memento is to be awarded to the participants it shall carry the name and logo of both the parties to this MoU.

## Relationship between the Parties

It is expressly agreed that Shri Shivaji Mahavidyalaya, Barshi and M/s. Darshana Pulses, Barshi are acting under this MoU as independent contractors, and the relationship established under this MoU shall not be construed as a partnership. Neither Party is authorized to use the other Party's name in any way, to make any representations or create any obligation or liability, expressed or implied, on behalf of the other Party, without the prior written consent of the other Party. Neither Party shall have, nor represent itself as having, any authority under the terms of this MoU to make agreements of any kind in the name of or binding upon the other Party, to pledge the other Party's credit, or to extend credit on behalf of the other Party.

## 9. Confidentiality

In the course of the activities under this MoU it may be necessary for the Participants to disclose Confidential Information. Unless otherwise expressly permitted in this agreement, any and all information, correspondence, financial statements, records, data, or information that is competitively sensitive and not generally known to the public, including formulations, analysis, inventions, improvements and activities of the disclosing



Participant, disclosed by one Participant to the other Participant of this MoU, and other documents transmitted or communicated by either Participant to the other Participant that is marked as confidential or proprietary for the purposes of this agreement ("Confidential Information") shall be received and treated in confidence, and shall not be used by the receiving Participant or disclosed by the receiving Participant without the prior written consent of the disclosing Participant, which consent shall not be unreasonably withheld or delayed. These restrictions on use or disclosure of information do not extend to any item of information which (a) is publicly known at the time of the disclosure, (b) is lawfully received by the receiving Participant from a third party which does not have a confidential relationship to the disclosing Participant, (c) the receiving Participant can demonstrate was in its possession or known by it before its receipt from the disclosing Participant, or (d) the receiving Participant is required by law to disclose to government authorities (including courts). Unless otherwise required under a subsequent binding agreement, each receiving Participant shall, at the expiry or termination of this agreement, return to the disclosing Participant any and all documents provided by the disclosing Participant setting out as Confidential Information.

## 10. Intellectual Property Rights

All Intellectual Property (including but not limited to trade secret, copyrights and patents, etc. if any) of either Party in existence on the effective date shall remain the property of their respective owner/party. Ownership of any and all Intellectual Property developed or created by or for a Party after the effective date as part of the delivery of the services or performance under this MoU shall be decided on case-to-case basis depending on the contribution of the Party to develop the same with a separate written agreement signed between the Parties.



## 11. Amendment

The present Memorandum of Understanding can be amended by the Parties through mutual consultation. The amendments shall be enclosed with the present Memorandum of Understanding and shall form an integral part of it thereof.

## 12. Validity & Termination

This MoU shall be valid for <u>o5</u> years. The Memorandum of Understanding will enter into force on the date of signing and shall remain in force throughout the period or unless revoked by the consent of the Parties. Either of the Parties may terminate the present Memorandum of Understanding by giving the other party a written notice of ninety days in advance of its decision to terminate this Memorandum of Understanding. Termination will not affect activities covered by a collaborative contract between the executive agencies and already underway at the time of termination.

## 13. Settlement of Dispute

Any disputes arising out of the implementation or interpretation of the provisions of this Agreement and or dispute relating to any aspect of academic cooperation shall be settled amicably or will try to jointly resolve the dispute if any by direct negotiations between the top officials of the first and second party to this MoU at the place mutually agreed between them / at Solapur as the case may be.

## 14. Non-Binding Nature

This MoU is not intended to and does not give any person who is not a Participant to it any rights to enforce any of its provisions. Nothing in this MoU will be construed as creating a binding legal relationship between the Participants, with the exception of condition which will survive the expiry or termination of this MOU. This MOU is a broad statement of intent which sets forth the general basis upon which the Participants wish to



proceed. No legal liability will arise in respect of any subject matter hereof unless a subsequent binding agreement is negotiated, approved, executed and delivered by the Participants to this MOU.

All the above contents are read over and understood by both the parties to this MoU. Hence the MoU is executed on og day of Aprilmonth 2022\_

Shri Shivaji Mahavidyalaya, Barshi

Name: Prof. A.B. Shaikh,

Designation: Principal,

Shri Shivaji Mahavidyalaya,

Barshi

PRINCIPAL

Shri Shivoli Mahavidyalaya, Barshi, Dist. Solapur-413411 Date:

Place: Shri Shivaji Mahavidyalaya,

Barshi

Witnessed by:

M/s. Darshana Pulses, Barshi

Sign:

Name: Mr. Dilip S. Gandhi,

Designation: Owner,

M/s. Darshana Pulses, Barshi

Date:

Darshana Pulses

Proprietor





Contents lists available at ScienceDirect

# Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy

journal homepage: 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-Chein Ling <sup>f</sup>, Mansing A. Anuse <sup>g</sup>, Ganesh S. Kamble <sup>a,h,\*</sup>

- Department of Engineering Chemistry, Kolhapur Institute of Technology's College of Engineering (Autonomous), Kolhapur, Affiliated to Shivaji University, Kolhapur 416234, India
- School of Chemical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur 413225, India
- Department of Chemistry, Doodhsakhar Mahavidhalaya, Bidri, Kolhapur 416208, Indla
- <sup>d</sup> Department of Chemistry, The New College, Kalhapur 416012, India
- \* Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi 413411, India
- Department of Chemistry, National Tsing Hua University, Hsinchu 300, Taiwan
- 8 Department of Cheinistry, Shivaji University, Kolhapur 416004, India
- <sup>ti</sup> Shri Jagdishprasad Jhabarmal Tibrewala University, Vidyanagari, Rajasthan 333001, India

#### HIGHLIGHTS

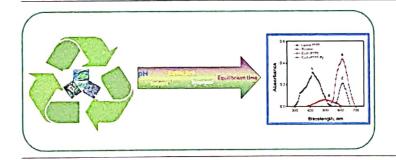
•Easy synthesis of chromogenic ligand. The method has to be showed the synergistic effect on extraction and spectrophotometric determination of copper(II). Dilute pyridine used as an auxiliary extractant. Successfully applied for real sample analysis. The developed method is reliable for determination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

## ARTICLE INFO

Article history: Received 27 May 2021 Received in revised form 7 September 2021 Accepted 10 October 2021 Available online 23 October 2021

Keywords: Coppr(II) PTPT Pyridine Spectrophotometry Liquid-liquid extraction

#### GRAPHICAL ABSTRACT



#### ABSTRACT

In this article, a novel spectrophotometric reagent 1-(pyrimidine)-4, 4, 6-trimethyl-1,4-dihydropyrimi dine-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  $\mu$ g mL<sup>-1</sup> of copper(II) and optimum concentration range is evaluated by Ringbom's plot and it is found that 2.5–25  $\mu$ g mL<sup>-1</sup>. In presence of pyridine, molar absorptivity and Sandell's sensitivity of copper(II)-PTPT complex is 2.80  $\times$  10<sup>3</sup> L mol<sup>-1</sup> cm<sup>-1</sup> and 0.226  $\mu$ g cm<sup>-2</sup>, respectively and in absence of pyridine, molar absorptivity and Sandell's sensitivity of

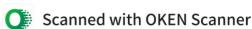
Abbreviations: PTPT, 1-(pyrimidine)-4, 4, 6-trimethyl-1.4-dihydropyrimidine-2-thlol; PAR, 4-(2-Pyridylazo) resorcinol; Py, Pyridine; Sy, Synergent.

• 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.

E-mail address: ganeshchemistry2010@gmail.com (G.S. Kamble).

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# 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. Gavall<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  $\rm H_2SO_4$  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  $\rm H_2SO_4$  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  $\rm H_2SO_4$  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

Uraxium 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].

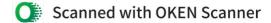
Several aromatic and aliphatic long chain amines such as Amberlite LA-1 / LA-2 [17], 2-Octylamino pyridine [18], N-n-octylaniline [19], Tri-n-octylamine (Tri-n-octylamine Thorium [20], Tri-n-octylamine Uranium [21, 22], Tri-iso-octylamine [23], synergism of N-n-octylaniline and trioctylamine [24], alamine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

- □ Umesh B. Barache umesh.barache@gmail.com
- □ Laxman V. Gavali laxmanvg70@gmail.com
- Department of Chemistry, Smt. Chandibai Himathmal Mansukhani College, Ulhasnagar 421003, Maharashtra, India
- School of Chemical Sciences, Punyashlok Ahilyadevi Holkar Solapur University, Solapur 413255, Maharashtra, India
- Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi 413411, Maharashtra, India
- Department of Chemistry, Karmaveer Bhaurao Patil College, Vushi, Navi Mumbai 400703, Maharashtra, India

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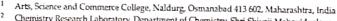




Article

## 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-Holguin <sup>11</sup>, Shashikant H. Gaikwad <sup>2,\*</sup>, Shiva Prasad Kollur <sup>12,\*</sup> and Daniel Glossman-Mitnik <sup>11</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
- Department of Biotechnology and Bioinformatics, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, Karnataka, India
- Department of Chemistry, N. K. Orchid College of Engineering and Technology, Solapur 413 002, Maharashtra, India
- Biology Department, Faculty of Sciences, King Khalid University, Abha 61421, Saudi Arabia
  - Cell Culture Lab, Egyptian Organization for Biological Products and Vaccines (VACSERA Holding Company), 51 Wezaret El-Zeraa St., Agouza, Giza 12311, Egypt
  - 8 Division of Biochemistry, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, Karnataka, India
  - Department of Hospital Surgery, N.L Pirogov Russian National Research Medical University (RNRMU), 117997 Moscow, Russia
- Departament de Química, Facultat de Ciènces, Universitat de les Illes Balears, E-07122 Palma de Malllorca, Spain
- Laboratorio Virtual NANOCOSMOS, Departamento de Medio Ambiente y Energia, Centro de Investigación en Materiales Avanzados, Chihuahua 31136, Chih, Mexico
- School of Physical Sciences, Annita Vishwa Vidyapeetham, Mysuru Campus, Mysuru 570 026, Karnataka, India
- Correspondence: rasayanshg@gmail.com (S.H.G.); 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/paranitrobenzaldehyde having composition  $[Ni(L)_2(H_2O)_2]$ . The obtained ligands and their complexes were characterized using physico-chemical techniques viz., elemental analysis, magnetic moment study, spectral (electronic, FT-IR, 1H-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 allvicans) 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.



Ciution: Deodware, S.A.;
Barache, U.B., Dhale, P.C.;
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## Chemical synthesis, spectral characterization and biological activities of new diphenylsulphone derived Schiff base ligand and their Ni(II) complexes

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

- \* Chemistry Research Laboratory, Department of Chemistry, Shrl Shivaji Mahavidyalaya, Barshi, Solopur 413-411, Maharashtra, India
- b Department of Microbiology, Dr. Babasaheb Ambedkar Marathwada University, Sub Campus, Oumanabad 413501, Maharashtra, India
- N.K. Orchid College of Forgineering and Technology, Solapur 413002, Maharusahra, India
- d Department of Chemistry, Walchaud College of Art, Science and Commerce, Solopur 412 006, Maharushtro, India
- Department of Blacechnology, and Bioinformatics, School of Life Sciences, JSS Academy of Higher Education and Research, Mystern, Karnataka 570 015, India Department in Chemistry, Bangalore Institute of Technology, K.R. Road, VV Puram, Bangalore 560 004, Karnataka, India
- Centre for Illowchnology, Proving Institute of Medical Sciences (Deemed to be University), Lonf 413-736, Ahmednagar, Maharashtra, India
- h School of Physical Sciences, Amrita Vishwa Vidyapeetham, Mysuru Canques, Mysuru, Karnatuka 570 026, India

#### ARTICLE INFO

Kerworde Schill base NI(II) complex Antimicrobial Anticancer activity

#### ABSTRACT

This work presents the preparation and spectral characterization of five diphenylsulphone derived Schiff base ligands (L $_1$ -L $_3$ ). 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, TOA 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 case 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. Salicylaidehyde and its derivatives are useful carbonyl precursors for the synthesis of a large variety of Schiff bases. Additional coordinating groups attached to sallcylaldehyde increase the denticity of the Schiff bases and their ability to generate polynuclear complexes. Salicylaldehyde derivative is 3-methoxysalicylaldehyde (ovanilln), which was largely employed for the synthesis of compartmental llyands [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

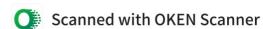
E-mail addresses: rmk.microbiology@banu.ac.in (R.M. Khobrogade), chandans@jssunl.edu.in (C. Shivamallu), foghavendra@postpias.org (H.L. Raghavendra), rasayanshg@gmail.com (S.H. Galkwad), shlvachemist@gmail.com (S.P. Kollur).

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<sup>\*</sup> Corresponding authors.





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>2,4</sup> and Shiva Prasad Kollur <sup>14</sup>,\*

- Department of Chemistry, Sangameshawar College, Solapur 413 001, India
- Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Solapur 413 411, India
- Department of Chemistry, N. K. Orchid College of Engineering and Technology, Solapur 413 002, India
- Department of Microbiology, Dr. Babasaheb Ambedkar Marathwada University, Sub Campus, Osmanabad 413 501, India
- Department of Chemistry, Walchand College of Art and Science, Solapur 413 006, India
- Department of Medicine, Kasturba Medical College, Manipal Academy of Higher Education, Udupi 576 104, India
- 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
- B Department of Biotechnology and Bioinformatics, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, India
- Division of Biochemistry, School of Life Sciences, JSS Academy of Higher Education and Research, Mysuru 570 015, India
- Department of Hospital Surgery, N.I. Pirogov Russian National Research Medical University, Moscow 117997, Russia
- Institute of Biodesign and Modeling of Complex Systems, L.M. Sechenov First Moscow State Medical University (Sechenov University), Moscow 119991, Russia
- Biology Department, Faculty of Science, King Khalid University, Abha 9004, Saudi Arabia
- Cell Culture Lab, Egyptian Organization for Biological Products and Vaccines (VACSERA Holding Company),
  51 Wezaret El-Zeraa St., Giza 22311, Egypt
- 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.)

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

## check for updates

Citation: Gatkwad, K.D.; Ubale, P.; Khobragade, R.; Deodware, S.; Dhale, P.; Asabe, M.R.; Ovhal, R.M.; Singh, P., Vishwanath, P.; Shivamallu, C.; et al. Preparation, Characterization and In Vitro Biological Activities of New Diphenylsulphone Derived Schiff Base Ligands and Their Co(II) Complexes. Molecules 2022, 27, 8576. https://doi.org/10.3390/ molecules27238576

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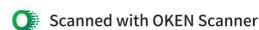
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1. Introduction

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

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# Memorandum of Understanding

Department of Botany,

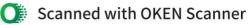
K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College, Vidyanagar, Bhosare

And

Department of Botany, Shri Shivaji Mahavidyalaya, Barshi

December 2022





# Memorandum of Understanding

This Memorandum of Understanding is between Department of Botany, K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College, Vidyanagar, Bhosare represented herein by its Principal

and

Department of Botany, Shri Shivaji Mahavidyalaya, Barshi represented by its Principal for establishing link between these two organizations to enhance each other's educational, academic and research activities in mutually beneficial manner.

## Objectives

The following goals will be accomplished by undertaking the following activities: The two Institutions will:

- a) To cooperate in the exchange of information relating to their activities in teaching and industry in fields of operating procedures and product formulation.
- b) To promote appropriate joint research projects and joint courses of study.
- c) To build up relationship between institutes to make access to students for campus interview.
- d) To allow students and teachers to use each others laboratory and library facilities.
- e) To arrange lectures for students to exchange knowledge.

#### **Duration:**

This Memorandum of Understanding ('MOU') will be effective from 10 12 2022 and will be terminated after five years.



## Conditions:

- 1. Revision or modification in the MOU may be done by both the parties with mutual understanding.
- 2. Memorandum of Understanding ('MOU') may be terminated by giving the notice to each party before the actual expiry date.
- 3. Memorandum of Understanding ('MOU') may be extended if both parties agree to continue it.

## Contact Information:

Sr. No	Name of College	Partner Representative
1.	K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College, Vidyanagar, Bhosare Tal: Madha, Dist Solapur Pin 413208 Phone: 02183 - 223245 Office Phone: 02183 - 234026 Office fax: 02183 - 234053	Partner Representative: Mr. A. M. Goyal Mobile: 8855849763 E- mail: goyalakash27@ gmail.com
2.	Shri Shivaji Mahavidyalaya, Barshi, Dist: Solapur – 413411	Partner Representative: Prof. Dr. Gaikwad S. S. Mobile No: 9011339913 E- mail:

Mr.A.M.Goyal

Head, Dept of Botany

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

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Department of Botany Shri Shivail Mahawidyalaya Barshi, Dist-Solapur

Shri Shivay Mehavidyalaya, Barahi





## MEMORANDUM OF UNDERSTANDING

#### BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

(National Service Scheme and Psychology Department)

&

## Ayush Institute For Addiction Management Jamgaon(A)

Prin. Dr. A. B. Shaikh Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur	Dr.Sandip Manikrao Tambare C.E.OAyush Institute For Addiction Management Jamgaon (A) Tq.Barshi Dist-Solapur

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya, Barshi & Ayush Institute For Addiction Management Jamgaon (A) Tq.Barshi Dist-Solapur

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Social awareness program
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This Memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months' advance to the other.

Dr. A. B. Shaikh

PRINCIPAL

Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411

Date: 27/12/2022



Dr. andip Tambare
C.E.O.

Avush Institute For

Ayush Institute For Addiction Management

## MEMORANDUM OF UNDERSTADING

This MEMORANDUM OF UNDRESTADING (herein after referred to as "MoU") is executed on this Day 21st of August 2021 at Shri Shivaji Mahavidyalaya, Barshi.

### BETWEEN

Shri Shivaji Mahavidyalaya, Barshi, is accredited and reaccredited with A grade by NAAC and serves for excellence in quality education for rural and poor students. It is accorded with *STAR* status by DBT, GOI and DST-FIST status and is awarded with Best College by Punyashlok Ahilyadevi Holkar Solapur University, Solapur (First Party).

#### AND

M/s. Darshana Solvent Extraction Pvt. Ltd., Barshi is a private company incorporated on 06 July 2021. It is classified as Non-govt company and is registered at Registrar of Companies, Pune. Its authorized share capital is Rs. 180,000,000 and its paid up capital is Rs. 180,000,000. It is involved in growing of crops; market gardening; has emerged as a brand in the market (Second Party).

## 1. Scope

We believe that for providing a better platform for students and stake holder including students from the university campus school, departments / center of institution and also the students from the various affiliated colleges / institutions and also the students from the autonomous college / institution etc. within the jurisdiction of this university to give better opportunities in various fields of education and interdisciplinary research etc. the collaboration and co-operation between themselves will promote more effective use of each of their resources, and provide each of them with enhanced opportunities.



## 2. Objectives of the MoU

The general objective of this Memorandum of Understanding (MOU) is to stimulate and facilitate the development of collaborative and mutually beneficial processes and technology transfer with respect to oil technologies and downstream processing of oil products in industries.

## 3. Areas of collaboration

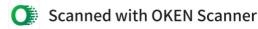
Production, Quality control, Quality Assurance, Research & Development (R & D).

## 4. Proposed modes of collaboration

Academic members of staff and other personnel of one partner in situation may spend periods not normally exceeding one Week in the other partner institution. In supporting such an arrangement, the home institution undertakes to continue the salary of the participant. All other financial matters, including travel costs, are subject to individual negotiation, and will normally be the responsibility of the persons involved and their home institution.

#### 5. Terms and Conditions

- 1. All activities shall be executed only after written consent. of both the parties.
- 2. The Memorandum signed will be the guiding document for both the parties for execution of the actions and initiatives in the near future. Both the organizations will encourage its members to define the overall strategy and roadmap to carry out the action points contained in it and report on the progress achieved at regular intervals.
- During the signing ceremony, Prof. A.B. Shaikh, Principal, Shri Shivaji Mahavidyalaya, Barshi welcomed the proposal and said that the industry would nurture academic and research interest among students.



- 4. Mr. Shital S. Gandhi, Managing Director, M/s. Darshana Solvent Extraction Pvt. Ltd., Barshi said that the company is also excited and looks forward for a fruitful association with Shri Shivaji Mahavidyalaya, Barshi. He added all possible help with regards for beneficial value addition to both the giants for a win-win situation.
- 5. The signing-off ceremony ended with a note to make this initiative as a role model for Academic -Industry Linkages.
- 6. The aim of the Memorandum of Understanding shall be to achieve a broad balance in the respective contributions and benefits of the collaboration, and this shall be subject to periodic review by these organizations.
- 7. Academic members of staff and other personnel of one partner in situation may spend periods not normally exceeding one Week in the other partner institution. In supporting such an arrangement, the home institution undertakes to continue the salary of the participant. All other financial matters, including travel costs, are subject to individual negotiation, and will normally be the responsibility of the persons involved and their home institution.
- 8. The host institution agrees to assist in the seeking of appropriate housing, and to supply work space, library and technical facilities as appropriate.
- 9. In the implementation of specific cooperative programs, a written agreement covering all relevant aspects including funding and the obligations to be undertaken by each party will be negotiated, mutually agreed and formalized in writing, prior to the commencement of the program.
- 10.Shri Shivaji Mahavidyalaya, Barshi shall not hold M/s Darshana Solvent Extraction Pvt. Ltd., Barshi liable for any damage that is



- caused. Whether directly or indirectly, by M/s. Darshana Solvent Extraction Pvt. Ltd., Barshi and vice versa.
- 11. Shri Shivaji Mahavidyalaya, Barshi will indemnify any loss suffered by M/s Darshana Solvent Extraction Pvt. Ltd., Barshi that is caused. Whether directly or indirectly and vice versa.
- 12.All these Organizations /departments on their respective websites will mention this Partnership/ collaboration and it be mentioned in the right context.
- 13. The necessary secrecy of the work will be taken care by both the organizations/ implementing Department of the organization.
- 14. The contract will be governed by the rules, regulations & laws of Govt. of India, UGC, Government of Maharashtra and the Punyashlok Ahilyadevi Holkar Solapur University, Solapur.
- 15. There will be a coordinating committee consisting of the Principals and heads of respective organizations. Additional members will be included as per the need.
- 16. This agreement will take effect from the date of its signing and shall be valid for an unlimited period from that date unless sooner terminated, revoked or modified by mutual written agreement between tile Parties, and may be extended by mutual written agreement.
- 17. Either party may terminate the Agreement at any time during tile term by the provision of three months written notice to the other party.

## 5. Financing

This MoU does not confer any financial liability on any of the parties to this MoU. The activities which require financial assistance shall be decided by mutual consent of both the Parties and shall be initiated only after written agreement to this effect which includes financial contributions of all or any of kinds and specifying the sharing of profit if any.



## 6. Nomination of Coordinators

Prof. S.H. Gaikwad,
Head of Department,
Department of Chemistry,
Shri Shivaji Mahavidyalaya,
Barshi.

## 7. Arrangements for visiting officials

#### 8. Use of Names

Except in promoting the activities proposed in Article 1.1 above among its faculty, staff, and students, neither Participant may use the name of the other Participant in any form of advertising or publicity without express written permission. seek permission from one another by submitting the proposed use, well in advance of any deadline, also any activity for which the certificate and or memento is to be awarded to the participants it shall carry the name and logo of both the parties to this MoU.

## Relationship between the Parties

It is expressly agreed that Shri Shivaji Mahavidyalaya, Barshi and M/s Darshana Solvent Extraction Pvt. Ltd., Barshi are acting under this MoU as independent contractors, and the relationship established under this MoU shall not be construed as a partnership. Neither Party is authorized to use the other Party's name in any way, to make any representations or create any obligation or liability, expressed or implied, on behalf of the other Party, without the prior written consent of the other Party. Neither Party shall have, nor represent itself as having, any authority under the terms of this MoU to make agreements of any kind in the name of or binding upon the other Party, to pledge the other Party's credit, or to extend credit on behalf of the other Party.



## 9. Confidentiality

In the course of the activities under this MoU it may be necessary for the Participants to disclose Confidential Information. Unless otherwise expressly permitted in this agreement, any and all information, correspondence, financial statements, records, data, or information that is competitively sensitive and not generally known to the public, including formulations, analysis, inventions, improvements and activities of the disclosing Participant, disclosed by one Participant to the other Participant of this MoU, and other documents transmitted or communicated by either Participant to the other Participant that is marked as confidential or proprietary for the purposes of this agreement ("Confidential Information") shall be received and treated in confidence, and shall not be used by the receiving Participant or disclosed by the receiving Participant without the prior written consent of the disclosing Participant, which consent shall not be unreasonably withheld or delayed. These restrictions on use or disclosure of information do not extend to any item of information which (a) is publicly known at the time of the disclosure, (b) is lawfully received by the receiving Participant from a third party which does not have a confidential relationship to the disclosing Participant, (c) the receiving Participant can demonstrate was in its possession or known by it before its receipt from the disclosing Participant, or (d) the receiving Participant is required by law to disclose to government authorities (including courts). Unless otherwise required under a subsequent binding agreement, each receiving Participant shall, at the expiry or termination of this agreement, return to the disclosing Participant any and all documents provided by the disclosing Participant setting out as Confidential Information.

## 10. Intellectual Property Rights

All Intellectual Property (including but not limited to trade secret, copyrights and patents, etc. if any) of either Party in existence on the



effective date shall remain the property of their respective owner/party. Ownership of any and all Intellectual Property developed or created by or for a Party after the effective date as part of the delivery of the services or performance under this MoU shall be decided on case-to-case basis depending on the contribution of the Party to develop the same with a separate written agreement signed between the Parties.

## 11. Amendment

1

1

The present Memorandum of Understanding can be amended by the Parties through mutual consultation. The amendments shall be enclosed with the present Memorandum of Understanding and shall form an integral part of it thereof.

# 12. Validity & Termination

This MoU shall be valid for 05 years. The Memorandum of Understanding will enter into force on the date of signing and shall remain in force throughout the period or unless revoked by the consent of the Parties. Either of the Parties may terminate the present Memorandum of Understanding by giving the other party a written notice of ninety days in advance of its decision to terminate this Memorandum of Understanding. Termination will not affect activities covered by a collaborative contract between the executive agencies and already underway at the time of termination.

# 13. Settlement of Dispute

Any disputes arising out of the implementation or interpretation of the provisions of this Agreement and or dispute relating to any aspect of academic cooperation shall be settled amicably or will try to jointly resolve the dispute if any by direct negotiations between the top officials of the first and second party to this MoU at the place mutually agreed between them / at Solapur as the case may be.



## 14. Non-Binding Nature

This MoU is not intended to and does not give any person who is not a Participant to it any rights to enforce any of its provisions. Nothing in this MoU will be construed as creating a binding legal relationship between the Participants, with the exception of condition which will survive the expiry or termination of this MOU. This MOU is a broad statement of intent which sets forth the general basis upon which the Participants wish to proceed. No legal liability will arise in respect of any subject matter hereof unless a subsequent binding agreement is negotiated, approved, executed and delivered by the Participants to this MOU.

All the above contents are read over and understood by both the parties to this MoU. Hence the MoU is executed on 21 day of Aug month 202).

Shri Shivaji Mahavidyalaya, Barshi

Sion

Sign:

Name: Prof. A.B. Shaikh,

Designation: Principal,

Shri Shivaji Mahavidyalaya,

Barshi
Date:

1

PRINCIPAL

Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411

Place: Shri Shivaji Mahavidyalaya,

Barshi.

Witnessed by:

M/s. Darshana Solvent Extraction Pvt. Ltd., Barshi

Sign:

Name: Mr. Shital S. Gandhi,

**Designation:** Managing Director, M/s. Darshana Solvent Extraction

Pvt. Ltd., Barshi

Date:







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## Results in Chemistry

journal homepage: www.sciencedirect.com/journal/results-in-chemistry





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

- A Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyolaya, Burshi, Selapur 413 411, Maharashtra, India
- b Jawahar Arts, Science and Commerce College, Anadur, Osmanabad 413 501, Maharashtra, India
- Department of Chemistry, Kolhapur Institute Technology's College of Engg. (Autonomous), Kolhapur 416 234, Maharushtra, India
- d Department of Chemistry, Rajurum College, Kolhapur 416 004, Maharashtru, India
- N.K. Orchid College of Engineering and Technology, Solapur 413 002, Maharashtra, India
- 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

#### ABSTRACT

The new Schiff base ligands 4-(2'/3'/4'-nitrobenzelideneimino)-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 antimierobial 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-11226), 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 thlone-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 lii) two nitrogen atoms at position 1 and 2 ln 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 alm 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

E-mail addresses: rasayanshg@gmail.com (S.H. Galkwad), shivachemist@gmail.com (S. Prasad Kollur),

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<sup>\*</sup> Corresponding authors.

## rediffmail

Mailbox of ssmb\_barshl

Subject: Fw: Science Setu 2021

From: shivaji collage<ssmb\_barshi@rediffmail.com> on Thu, 18 Feb 2021 14:55:29

To: "vsshinde@nccs.res.in"<vsshinde@nccs.res.in>

1 attachment(s) - National\_Centre\_for\_Cell\_Science.pdf (101.91KB)

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi.

From: "shivaji collage"<ssmb\_barshi@rediffmail.com> Sent: Thu, 18 Feb 2021 14:54:52 GMT+0530 To: "vsshinde@nccs.red.in"<vsshinde@nccs.red.in> Subject: Fw: Science Setu 2021

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi.

From: Garima Gupta Scientist E <garima.g@nic.in> Sent: Fri, 22 Jan 2021 18:13:13 GMT+0530

To: sophiacollegemumbai@gmail.com, principal.tccollege@gmail.com, principal@tccollege.org, anita.kanwar@ves.ac.in, vesasc.admin@ves.ac.in, vazecollege@gmail.com, principalascs@sies.edu.in, ratnam\_college@rediffmail.com, ssmb\_barshi@rediffmail.com, principal@ruparel.edu, principal.agc@mespune.in, principal@mithibai.ac.in, rajpal.hande@mithibai.ac.in, wadiaashok20@yahoo.com, principal@patkarvardecollege.edu.in, info@patkarvardecollege.edu.in, mesacscollege@gmail.com, sonaicollege@yahoo.co.in, laware\_sl@yahoo.com
Subject: Science Setu 2021

## Dear All,

The Science Setu programme was launched by the Department in 2014 as a measure to address the problem of paucity of teaching resources in higher education leading to a lack of connectivity between academic scholarship and teaching. The programme provides scope for the scientists in number of DBT Autonomous Institutions across the country to take up systematic teaching commitments at the undergraduate level, besides PhD courses. On the other hand, Science Setu provides a unique exposure to science students and teaching faculty at the undergraduate colleges to the cutting edge research that is being carried out at the premier research institutes. Apart from attending training sessions, students and faculty stand to gain immensely from handson experiments and demonstrations that are conducted during these visits.

In view of the restrictions due to the ongoing Covid-19 pandemic, physical visits and gathering are currently not possible; hence the Science Setu is being planned as a virtual platform of learning front of January 2021 onwards. The Autonomous Institutes under the aegis of Department of Biotechnology have been informed and they will coordinate with the colleges assigned to them to plan for conducting virtual

https://f4mail.rediff.com/ajaxprism/readmail?printable=1&block\_mase=1&file\_name=1613640329.S.228483.Z.RU.rfs303,rfs303,188,167.24362.f...

tours of laboratories, webinars for participants, live question and answer / quiz sessions and other related interactive initiatives that you deem appropriate.

The list of colleges allocated to various Autonomous Institutes is attached for kind reference. The Colleges are requested to get in touch with the AIs to make this event successful.

In anticipation of your kind support.

With warm regards, Dr. Garima Gupta Scientist 'E'

डॉ गरिमा गुप्ता,

वैज्ञानिक - ईं , जैव प्रौद्योगिकी विभाग , विज्ञानं एवं प्रौद्योगिकी मंत्रालय कमरा न. 510, ब्लॉक ३ सी. जी. औ. परिसर लोधी रोड नई दिल्ली-110003

Dr. Garima Gupta,

Scientist - 'E', Department of Biotechnology, Ministry of Science & Technology Room No. 510, Block 3 CGO Complex Lodhi Road, New Delhi-110003





	<u> </u>	shivaji collage	Re DBT Science Setu-India@75 Webinar, 3 June; 4 P	Sent	2/6/21 10:10 pm
Book	~	☐ shlvaji collage	Re. DBT Science Setu - Women's Day at NCCS	Sent	8/3/21 3:51 pm
		Principal TC College Bar	Re: DBT Science Setu - Women's Day at NCCS	Inbox	8/3/21 1:25 pm
		jyoti@nccs.res.in	DBT Science Setu - Women's Day at NCCS	Inbox	7/3/21 10:03 am
1		ahlvaji collage	Re: DBT Science Setu: Science Day at NCCS, Pune	Sent	27/2/21 11:14 pm
diff.com Indla Limite   Privacy Policy   T   Feedback		☐ jyoti@nccs res.in	DBT Science Setu - Participation by Star DBT Colle	Inbox	19/2/21 7:10 pm
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## BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

Sc

## SANGHVI QUALITY PRODUCTS PVT. LTD., BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur.

Shri Vinay Sanghvi Director, Sanghavi Quality Products Pvt. Ltd. Barshi Dist-Solapur

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Sanghvi Quality Products Pvt. Ltd. Barshi.

## Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

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

Dr. P. R. Thorat

Date: 30 06 2020

Solsbarring Solsbarring

anghvi Quaitty Products PvLLtd.

**Authorised Signatory** 

Shri Vinay Sanghvi

## MEMORANDUM OF UNDERST<u>AN</u>DING

#### BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

## VAISHNAVI AGRO, PRODUCTS, BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur.

Shri Pradip Amritlal Bagmar Chairman, Vaishnavi Agro. Products, 69 Market yard, Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Vaishnavi Agro. Products, Barshi.

## Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

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Shri Shlvaji Mahavidyalaya, Barshi, Dist. Solapur-413411

Dr. P. R. Thorat

Date: 07 07 2020

Solapiv

Agro

For Vaishannavi Agro Products

## BETWEEN

#### SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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#### PUSHPAN IMAGING CENTRE, BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi, Dist- Solapur. **Dr. V. N. Janrao** Director, Pushpan Imaging centre Barshi, Dist-Solapur

## Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Pushpan Imaging centre Barshi.

## Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

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PRINCIPAL Sırri Shivaji Mahavidyalaya, Barshi, Oist, Solopur-41341)

Dr. P. R. Thorat

Date: 01/07/2020

Dr. V. N. Janrao

Dr. Vivekanard N. Janrao Reg. No.68115 M.D.(RAD.) Pushpan Imaging Center 729/7/3+4+5+6/8. Kasanyadi Road,

BARSHI - 413 411

## BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

&

## DR. JAGTAP PATHOLOGY LABORATORY, BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist-Solapur

**Dr. R. V. Jagtap**Director, Dr. Jagtap Pathology
Laboratory, Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Dr. Jagtap Pathology Laboratory, Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

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

Dr. P. R. Thorat

Date: 04/07/2020

Dr. R. V. Jagtap

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

#### BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

&

## Shri Bhagwant Blood Bank, Barshi.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur Shri Shashikant R. Jagdale
First Floor, Dr. Lamkane Building,
Near Kurduwadi Naka, Barshi.

## Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Shri Bhagwant Blood Bank, Barshi.

## Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
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PRINCIPAL Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411

Dr. P. R. Thorat

Date: 15 07 2020

Shri Shashikant R. Jagdale

Shri Bhagwant Blood Centre Barshi-413411

#### BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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## JAGDALE MAMA HOSPITAL, BARSHI

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist-Solapur

Dr. R.V. Jagtap Medical Superintendent, Jagdale Mama Hospital Barshi Dist-Solapur

## Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Jagdale Mama Hospital Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

## Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Shri Shivaji Mahandyalaya Barshi, Dist. Solapur-413411

Dr. P. R. Thorat

Date: 06 07 2020

Dr. R. V. Jagtap

## BETWEEN

#### SHRI SHIVAJI MAHAVIDYALAYA BARSHI

D.

## ATUL FEED, BARSHI.

Prin, Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur,

Shri Atul C. Sonigra Chairman, Atul Feed, Gat No.109/2 Kadamvasti Fafalwadi Tal- Barshi, Dist-Solapur

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Atul Feed, Barshi...

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

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PRINCIPAL
Shri Shivaji Mahavidyalaya,
Barshi. Dist. Solapur-41341)

Dr. P. R. Thorat

Date: 0 2 0 3 2 0 2 0

Shri Atul C. Sonigra

Gas No. -100/2, Kadam Voatl,
Inahavidyalaya,
Barshi 4 1840

# Memorandum of Understanding

## Between

# Department of Zoology Shri Shivaji Mahavidyalaya Barshi Barshi- 413401

And

Warana Dairy and Agro Industries Ltd.
Barshi- 413401

2020



This Agreement represents a mutual understanding and establishes a strategic partnership for research, identification and implementation of learning and development needs of students and teachers at graduate, post graduate and research level in field of Zoology.

## I- Parties:

Party 1 - Department of Zoology, Shri Shivaji Mahavidyalaya, Barshi

Party 2 -Warana Dairy and Agro Industries Limited, Barshi

The parties to this understanding with Warana Dairy and Agro Industries Limited, Barshi as a representative for guidance and facility providing for research in Zoology.

# II- General Responsibilities of both parties:

- The parties will work together to conduct research in the field Animal sciences depending on the project and facilities available with either institute in the concern field.
- Parties will not impose to make compulsory to create the facility for special project if
  any, in case if fund will be available from sponsored grand in aid providing agencies
  like UGC, Govt. management of the organization or any other etc.
- 3. The specialized facilities can be created in the interest of research project with mutual benefit of both parties. The passion of such facility will be with the party to whom the financial assistance will be provided. To maintain of such equipment will be done by the party who possess it.
- 4. Cost of consumable and utilities for research project and operation of instrument will be done on mutual understanding and availability of funds with either party.
- Both parties agree to share the facility available for utilization of research project on academic concessional basis.
- The scheduling and participation in research project will be done with both parties with mutual consultation.
- Exchange of invitations to scholars for participation in conferences, symposia, and seminars.
- Exchange of faculty, research personnel graduates, undergraduate and post graduate students for study and research.
- 9. Each party reserves the right to unilaterally terminate the MOU should the other partner fail to fulfil its responsibilities as stated here in.

## 111- Specific Roles and responsibilities of each party:

By entering this agreement, the Warana Dairy and Agro Industries Limited, Barshi

To identify the research projects and discuss with the expertise available with both the parties.

- 1. To prepare and finalize plan of work, strategies, and responsibilities of each party.
- 2. Provide facilities which are already available for the research project undertaken.
- 3. Provide available facilities with minimal /concessional cost basis as decided mutually from time to time and as per the need of the requirement of the project.
- 4. The parties shall remain independent of one another and nothing here in shall be construed or interpreted, by implication or otherwise to form a partnership, agency, joint venture or other formal business association.
- 5. Both institutions subscribe to the policy of equal opportunity and do not discriminate on any basis, including but not limited to race, easte, sex, age, ethnicity, religion or national.

## IV Duration:

This memorandum of understanding is effective on the date of last party signature. The MOU shall be for a period of 4 years and may be renewed upon mutual written agreement. Amendments will be made as deemed necessary and agreed to by the signing parties. The MOU may be terminated by either party with notification to other party, six months prior to the effective date of termination.



## V. Signature:

The MOU is written signed in four copies having equal force, each party receiving two copies for the record.

Place: Barshi

Date: 7 | 10 | 20

**Note:** This MOU will become effective from the date of signature by the representatives of the institutions and, if applicable, approval by appropriate authorities for five years.

## SIGNATURE OF THE PARTIES:

PARTY 1st

PARTY2<sup>nd</sup>

Head

Department of Zoology Shri Shivaji Mahavidyalaya Barsi, Dist Solapur

Dr. S. S. Salunkhe Head, Dept. of Zoology Shri Shivaji Mahavidyalaya Barshi, Dist. Solapur General Manager
Warana Dairy And Agro Industries L\*

Mr. Prashant Ghewari Plant Head (GM), Warana Dairy & Agro Industries Ltd. Barshi, Dist. Solapur



A Comment

PRINCIPAL Shii Shivaji Mahavidyalaya, Barshi, Dist. Solapur

PRINCIPAL

Dr. P. R. Thorat Shri Shivaji Mahavidyalaya Barshi, Dist. Solapur



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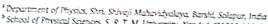
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Original article

## 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 d.s., Abdullah M. Al-Enizi d., Mohd Ubaidullah d., Ayman Nafady d., Badr M. Thamer d, Rajaram S. Mane by



School of Physical Sciences, S. R. T. M. Urcherstip, Nanded 431506, M.S., India

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Keywyde SiFeO3 and Pd-BiFeO3 NO2 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 BPO 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 NO2 gas sensor performance of the BPO sensor has been examined and explored. Moreover, the plausible gas sensing response mechanism of Pd-SFO 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 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 ℃ © 2020 The Author(s). Published by Elsevier R.V. on behalf of King Saud University. This is an open access article under the CC BY-NC-ND license (http://crestivectorimons.org/brenses/by-nc-nd-40/).

## 1. Introduction

Nitrogen dioxide (NO2), as one of the important sources for air pollurant, 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 NO2 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 (Uu 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 highperformance gas sensors to detect the NO2 gas in an economic

Corresponding authors.

F-mail addresses: saladdi Plotaeduss (S.F. Shabb), rayanamane 700 semma acm (RS Mane)

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way. In last few years, ternary metal oxides based on perovskite ABO3 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 (Ceorge 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 (Nto et al., 2004; Stermons et al, 2007).

Recently, various metal dopants in perovskire-based ferrite structures are used to enhance their gas sensing response and selectivity towards various gases. Fan et al. reported that the Sesubstituted 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 tunesten-doped BFO nano sensor over pristing for NO2 gas (Washmare et al., 2018). Pal et al. approved 25 s response/17 s recovery time at low concentration of acetone vapors for BPO nanoparticle sensors (Chakratorn) and Pd. 2019). Mursalin et el reported sono-chemically synthesis of 850 nanoparticle sensors with an outstanding SO2 gas sensing performance and ultrafast response/recovery time (Das et al. 2015). Pal et al. prepared BPO

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Department of Physics, Shruji Maharidyolaya, Udgir, Latur, India

Department of Chemistry, College of Science, King Saud University, Rhadh 11451, Saudi Arabia

# Memorandum of Understanding

## Between

# Department of Zoology Shri Shivaji Mahavidyalaya Barshi Barshi- 413401

## And

# **Bhoomi Vermicomposting Project**

(Agro-based Industry)

Mr. Dinesh Bhange

AT/PO. UplaiBudruk

Tal. Madha Dist. Solapur

2020



This Agreement represents a mutual understanding and establishes a strategic partnership for research, identification and implementation of learning and development needs of students and teachers at graduate, post graduate and research level in field of Zoology.

## I- Parties:

Party 1 - Department of Zoology, Shri Shivaji Mahavidyalaya, Barshi

Party 2 - Bhoomi Vermicomposting Project, Mr. Dinesh Bhange, Uplai, Budruk Tal.

Madha Dist. Solapur

The parties to this understanding with **Bhoomi Vermicomposting Project**, Mr. **Dinesh Bhange**, **Uplai**, **Budruk** as a representative for guidance and facility providing for research in Zoology.

## II- General Responsibilities of both parties:

- The parties will work together to conduct research in the field Animal sciences depending on the project and facilities available with either institute in the concern field.
- Parties will not impose to make compulsory to create the facility for special project if
  any, in case if fund will be available from sponsored grand in aid providing agencies
  like UGC, Govt. management of the organization or any other etc.
- 3. The specialized facilities can be created in the interest of research project with mutual benefit of both parties. The passion of such facility will be with the party to whom the financial assistance will be provided. To maintain of such equipment will be done by the party who possess it.
- Cost of consumable and utilities for research project and operation of instrument will be done on mutual understanding and availability of funds with either party.
- Both parties agree to share the facility available for utilization of research project on academic concessional basis.
- 6. The scheduling and participation in research project will be done with both parties with mutual consultation.
- 7. Exchange of invitations to scholars for participation in conferences, symposia, and seminars.
- 8. Exchange of faculty, research personnel graduates, undergraduate and post graduate students for study and research.

9. Each party reserves the right to unilaterally terminate the MOU should the other partner fail to fulfil its responsibilities as stated here in.

## III- Specific Roles and responsibilities of each party:

By entering this agreement, the Bhoomi Vermicomposting Project, Mr. Dinesh Bhange, Uplai, Budruk Tal. Madha Dist. Solapur

To identify the research projects and discuss with the expertise available with both the parties.

- 1. To prepare and finalize plan of work, strategies, and responsibilities of each party.
- 2. Provide facilities which are already available for the research project undertaken.
- 3. Provide available facilities with minimal /concessional cost basis as decided mutually from time to time and as per the need of the requirement of the project.
- 4. The parties shall remain independent of one another and nothing here in shall be construed or interpreted, by implication or otherwise to form a partnership, agency, joint venture or other formal business association.
- Both institutions subscribe to the policy of equal opportunity and do not discriminate
  on any basis, including but not limited to race, caste, sex, age, ethnicity, religion or
  national.

## **IVDuration:**

This memorandum of understanding is effective on the date of last party signature. The MOU shall be for a period of 4 years and may be renewed upon mutual written agreement. Amendments will be made as deemed necessary and agreed to by the signing parties. The MOU may be terminated by either party with notification to other party, six months prior to the effective date of termination.



## V. Signature:

The MOU is written signed in four copies having equal force, each party receiving two copies for the record.

Place:Barshi

Date: 6 111 20

**Note:** This MOU will become effective from the date of signature by the representatives of the institutions and, if applicable, approval by appropriate authorities for five years.

## SIGNATURE OF THE PARTIES:

PARTY 1st

PARTY2nd

Head

Department of Zoology Shri Shivaji Mahavidyalaya Barsi, Dist Solapur

Dr.S. S. Salunkhe Head, Dept. of Zoology Shri Shivaji Mahavidyalaya Barshi, Dist. Solapur grong S

Mr. Dinesh Bhange Bhoomi Vermicomposting Project Uplai, Budruk, Tal. Madha Dist. Solapur





PRÍNCIPAL Shii Snivaji Mahavidyalaya, Barshi,Dist.Solapur

PRINCIPAL

Dr.P. R. Thorat Shri Shivaji Mahavidyalaya Barshi, Dist. Solapur

## BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

## Shri Lakshiminarayan Dal Mil, Barshi

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist-Solapur

Shri. Khatod Dilipji Vishanudas Shri Laxminarayan Dal Mil Old Railway Station Latur Road Barshi

## Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Shri Laxminarayan Dal Mil Barshi.

## Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for Five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Shri Shivaji Mahavidyalaya, Barshi, Dist. Solopur-413411

Dr. P. R. Thorat

Shri. Khatod Dilipji Vishanudas

07/08/2020

## Between

## SHRI SHIVAJI MAHAVIDYALAYA, BARSHI

8

## BHARATI VIDYAPEETH'S

## DR. PATANGRAO KADAM MAHAVIDYALAYA, SANGLI

## Article 1

The subject at present Memorandum of Understanding is the establishment of a scientific and educational cooperation between Shri Shivaji Mahavidyalaya, Barshi, Dist: Solapur and

## Bharati Vidyapeeth's Dr. Patangrao Kadam Mahavidyalaya, Sangli

## Article 2

Both sides shall endeavor to favor as far as their financial means allow them:

- · Exchange of research ideas and methodology.
- · Exchange of faculty, students and scientific information.
- Other forms of cooperation made by mutual agreements.

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## Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Shrl Shivaji Mahavidyalaya, Barshi, Dist Solapur.

Dr. D. a. Kanase)

Bharati Vidyapoeth's Dr. Palangrao Kodem Mohaddyalaya, Saneti

Date:



Regular paper

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

Dilip D. Karad¹, Yogesh Somani², Hemant Khande³, Bipin Yadav⁴ and Arun S. Kharat⁴⊡

Department of Microbiology, Shri Shivaji Mahavidyalaya, Barshi, Solapur, Maharashtra, 413411, India; <sup>2</sup>Dr. Yogesh Sornani Hospital, Barshi, Solapur, Maharashtra, 413401, India; <sup>2</sup>Wockhardt Research Centre, Aurangabad, Maharashtra, 431210, India; <sup>2</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 pneumonlae, pandrug-resistant Providencia rettgeri, and Acinetobacter baumannii. Resistome analysis indicated that the bacterial isolates from the polymicrobial infection were multiple-drug resitnat and pandrug resistant clones. Molecular characterization revealed presence of blanch, in K. pneumonale, P. rettgeri and A. baumannii. The blaTEM-1 and blandm. genes were present in P. rettgeri and A. baumannil, whereas the  $bla_{TEM-1}$ ,  $bla_{NOM-1}$  and  $bla_{OXA-23}$  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.

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Pe-mail: arunkharat2007@gmail.com, 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.
Abbrevlations: VAP, Ventilator Associated Pneumonia; ESBL, Extended Spectrum β-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 faccium, Staphylococcus aureus, Klebsiella pneumoniae, A. baumannii, Psendomonas 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 (NDR-KP and PDR-KP) cases are increasing worldwide (Fiorellakrap et al., 2018). K. pneumoniae is the most clinically relevant Klebsiella species and is responsible for >70% of infections (Hansen et al., 1998). Artifictubial resistance has become a global crisis lycuis of usertancing resistance

Salapin-2

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 disseminaring 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 pneumonia 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 β-lactamase (ESBL)-producing isolates from inpatients than those from outpatients for both, Escherichia of 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 Enterobarteriaceae 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.

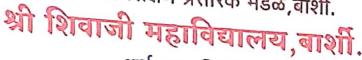
#### CASE PRESENTATION

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 venulator. Earlier, for 4 weeks, she received treatment at the Neurology Centre in Solapur, Maharashtra, and upon stabiliza-



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श्री शिवाजी शिक्षण प्रसारक मंडळ,बार्शी.





अर्थशास्त्र विभाग

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 इन्स्टिट्युट ऑफ सोशल सायन्सेस,मुंबई) (तुळजापूर कॅम्पस)

कार्यक्रमाचे अध्यक्ष

प्रा.डॉ.प्रकाश थोरात

(प्राचार्य, श्री शिवाजी महाविद्यालय,बार्शी)

प्रमुख उपस्थिती

प्रा.उत्तमराव हुंडेकर प्रा.डॉ.संग्राम चव्हाण

(अध्यक्ष,सोलापूर विद्यापीठ अर्थशास्त्र परिषद)

(अध्यक्ष,१५ वे वार्षिक अधिवेशन)

प्रा.डॉ.राजाराम पाटील

(सचिव,सोलापूर विद्यापीठ अर्थशास्त्र परिषद)

दिनांक/वेळ

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प्रा.एस.वी.शिरे (समन्वयक)

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

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#### BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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## Dr. Patil Laboratory, Barshi

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur Dr. Milind P. Patil
Dr. Patil Laboratory,
763 kasba Peth Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Dr. Patil Laboratory, Barshi

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

## Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for Five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

PRINCIPAL Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-41341)

Dr. P. R. Thorat

Date: 07/01/2019

Dr. Milind P. Patil

OP BALLIND P PAT

Reg.No.-02827

#### BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

&

## Kothari Laboratory, Barshi

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur Mr. Aditya Ashok Kothari Bhagyashri Apartment, Shivaji College Road, Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Dr. Kothari Laboratory, Barshi

## Article 2

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

Dr. P. R. Thorat

Date: 20.11.2019

Barahi Barahi

Mr. Aditya Ashok Kothari

कोठारी लॅबोरेटरी

## BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

&

## Ramkrushna Paramhansa Mahavidyalaya, Osmanabad

**Prin. Dr. P. R. Thorat** Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur Prin. Dr. Jaisingrao Deshmukh Ramkrushna Paramhansa Mahavidyalaya, Osmanabad.

## Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Ramkrushna Paramhansa Mahavidyalaya, Osmanabad

## Article 2

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

Dr. P. R. Thorat

Date: 06 04 2019

Mahaviore Barshi Barshi Solapur Artis

Dr. Jaisingrao Deshmukh

Principal Ramkrishna Paramhansa Mahavidyalaya,Osmanabad

Prin. Dr. Jaisingrao Deshmukh

#### BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

Š

## Dr. Jadhavar Hospital, Barshi

**Prin. Dr. P. R. Thorat** Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur

**Dr.Dipak Jadhavar** Chatrapati Colony Uplai Road, Barshi

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Dr. Jadhavar Hospital, Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

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- iii) Curriculum alignment with industry requirements.
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Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411

Dr. P. R. Thorat

Date: 03 04 2019

Dr. Dipak Jadhavar

Reg.No. # 177 \*\*

## BETWEEN

## SHRI SHIVAJI MAHAVIDYALAYA BARSHI

&

# Manodip Institute of Neuropsychiatric and Behavioral Sciences

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur Dr.Krishna Mastud Kurduwadi Road, Barshi

### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Manodip Institute of Neuropsychiatric and Behavioral Sciences

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
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PRINCIPAL Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-41341)

Dr. P. R. Thorat

Barshi Poly Solapur Andi Solapu

Dr. Krishna Mastud M.D.(Pay.) Reg.No.- 69192 Sanodeep Institute Barchi

Date: 05 08 2-019

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# 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.[1] 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."[1] 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.[1] 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.[2] 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. [3] With regard to the green chemistry principles, the biomass-derived glycerol. [4] is a "green solvent" and also considered as "organic water" owing to its promising properties like nontoxicity, biodegradability, nonvolatility, noncorrosiveness, inflammability, and inexpensiveness. [6] 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. 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. The strategies have been effectively carried out by using glycerol as a promising reaction medium.

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.[9] 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,[10] antimicrobial,[11] analgesic,[12] anti-inflammatory,[13] antitumor,[14] cardiotonic,[15] antifungal,[16] antihypertensive,[17] and calcium channel antagonists.[18] Consequently, a number of synthetic approaches have been reported for the preparation of pyrido[2,3d]pyrimidine derivatives.[19-22] 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;[23] 2) triethylbenzylammonium chloride (TEBAC)/water/90 °C/6-10 h,[24] 3) nanocrystalline MgO/water/80 °C/12-35 min, (25) 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;[27] 6) DMF/reflux/ 20-30 h;<sup>[28]</sup> 7) NaBr/ethanol or acetonitreile/electrolysis/25-30 min<sup>-[29]</sup> 8) SBA-Pr-SO<sub>1</sub>H/solvent free/5-45 min<sup>-[19]</sup> 9) Al-HMS-20/ethanol/RT/12 b(33); and 10) thiamine hydrochloride/water/90 °C/2-2.5 h.[34]

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

Mahav

Medicinal Chemistry Research Laboratory

Department of Chemistry Shivaji University Kolhapur, Maharashtra, India E-mail: pvanbhule@gmail.com

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1800202 (1 of 5)

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Month 2018

# 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>\*

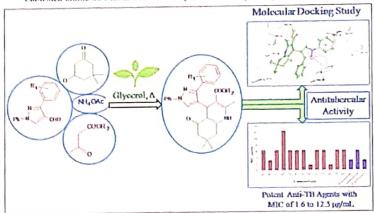
\*Chemistry Research Laboratory, Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi, Shivaji Nagar, Barshi, Muharashtra, India

Department of Chemistry, Balbhim College of Arts, Science and Commerce, Beed, Dist Beed, Maharashtra, India Medicinal Chemistry Research Laboratory, Department of Chemistry, Shivaji University, Kolhapur, Vidyanagar, Kolhapur, Maharashtra, India

Department of Chemical Technology, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Jalsingpura, 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-(111-pyrazol-4-yl)-polyhydroquinolines were synthesized through one-pot four-component Hantzsch condensation of 1,3-diphenyl-111-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 µg/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 Chent., 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 antitubercular (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



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# SHRI SHIVAJI MAHAVIDYALAYA BARSHI

# Shriman Rambhai Shah Blood Bank, Barshi

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist-Solapur

Dr. D. D. Karad Joint Secretary, Indian Red Cross Society, Somwar Peth, Barshi

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Shriman Rambhai Shah Blood Bank, Barshi

## Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

## Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for Five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

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

Dr. P. R. Thorat

IRCS Shriman Rambhai Shah Blood Centre, Barshi Jawahar Hospital Compound Barshi - 413 401.

Ph. No. - 222399

To.

Date: 15/01/2018

Prin Dr. P. R. Thorat Shil Shivan Mahavidyalaya: Barahi

Subject: Referring to your email for signing MOU with SILLO

Dear Sir.

This is reference to your email for signing the MOU with SIMACES in emalogical interceptionary Learning Center (SILC) formally known as Sakal Interpational Learning Center (SILC). Pune, We would like to safery you that you may send participants for the different courses that we have at SILC.

We would require minimum 15 candidates from your inclinite to start any batch independently especially: designed for your Or else you may also send candidates for our different eyen programs. The lees discounts would depend on the nominations sent for any course publish number of participants should be informed a days program you entail at handless probhung gesakal com

We look Toward to have being term rectionship in the and attooning with Shiring Mahayidyalaya.

Best Regards!

Sincerely,

Program Head - Business & Media

SILC

Sakal Hagar Gale Ho. 1. Farer Road, Abendi Pune al 1007
Teletec +91 020 2565 0142/43/63 | Email: contact Relaced Lin | Websile: www.stitcedicin







## MEMORANDUM OF UNDERSTANDING FOR ACADEMIC AND SCIENTIFIC COOPERATION

Shri Shivaji Mahavidyalaya Barshi (Solapur)-Maharashtra, India

DAV College of Science and Eumanities, Lalitpur, Nepal

## Purpose

The purpose of this Agreement is to promote cooperation in higher education and scientific research between the Shri Shivaji Mahavidyalara Barshi and DAV College of Science and Humanities, Lalitpur, Nepal

## Types of Cooperation

Through this memorandum, both Parties affirm the value of international collaboration and agree to promote the following activities:

- 1. Joint research projects in fields of mutual interests;
- 2, Exchange of academic publications and reports;
- 3. Opportunities for faculty and staff development and exclange;
- 4. Exchange of visiting research scholurs, including advanced graduate students;
- 5. Other activities as mutually agreed:

This Agreement places no financial obligations or supplementary funding commitments on either Party. These activities will be defined through separate program agreements that detail the commitment of resources (financial or otherwise) required by each Institution, Subsequent program agreements must be approved in writing by the authorized representatives of each institution.

P.O. Box: 929, Jawalakhel, Latispur, Tel: \$534426, Fax: 977-15546440, E-mail: dav.college@gmail.com, www.dovcolicge.edu.np









Principal Dr. P. R. Thorat, Shri Shivaji Muhavidyalaya, Barshi will serve as the primary liaison between the two institutions to facilitate the development of future activities.

## Terms

This Agreement will become effective upon the date of signature by both Parties. It shall remain valid for a period of five years from the date of the last signature, with the understanding that it may be modified by written mutual consent of both Parties. This Agreement may be terminated by either Party with advance written notice of at least thirty (30) days. Upon notice of termination both Shri Shivaji Mahavidyalaya and DAV College of Science and Humanities

s agree to work in good faith to enable visiting scholars to complete their respective research programs unhindered by the termination. The agreement may be extended by mutual consent of the two Parties after the five year period, and it must be renewed in writing.

This Memorandum of Understanding completed in English is hereby signed in two (2) copies with one (1) copy remaining in the possession of each institution.

Program Coordinator

ShashidBhurlia⊭6dhalurwedi

Dr. P. R. Thorat,

Shri Shivaji Mahavidyalaya Barshi

Shri Shivaji Mahavidyalaya, Barshi, Disi. Solapur-413411.



P.O. Noz: 929, Jawalakhel, Lalispur, Tel: 5514426, Fax: 977-15546440, E-mail: dav.college@gmail.com,

www.davcollege.edu.np









# MEMORANDUM OF UNDERSTANDING FOR ACADEMIC AND SCIENTIFIC COOPERATION

Shri Shivaji Mahavidyalaya Barshi (Solapur)-Maharashtra, India

And

Bal Kumari College Chtiwan, Nepal

The purpose of this Agreement is to promote enoperation in higher education and scientific research between the Shri Shlvaji Mahavidyalaya Barshi and Bal Kumari College Chtiwan, Nepal

Through this memorandum, both Parties affirm the value of international collaboration and agree to promote the following activities:

- 1. Joint research projects in fields of mutual interests;
- 2. Exchange of academic publications and reports;
- 3. Opportunities for faculty and staff development and exchange;
- 4. Exchange of visiting research scholars, including advanced graduate students;

This Agreement places no financial obligations or supplementary funding commitments on either Party. These activities will be defined through separate program agreements that detail the rany. These activities (financial or otherwise) required by each Institution. Subsequent commitment of resources (financial or otherwise) to the contract of t communent of the approved in writing by the authorized representatives of each program agreements must be approved in writing by the authorized representatives of each institution.







Principal Dr. P. R. Thorat, Shri Shivaji Mahavidyalaya, Barshi will serve as the primary liaison between the two institutions to facilitate the development of future activities.

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by either Party with advance written notice of at least thirty (30) days. Upon notice of termination both Shri Shivaji Mahavidyalaya and Bal Kumari College Chilyan, Nepal

agree to work in good faith to enable visiting scholars to complete their respective research programs unhindered by the termination. The agreement may be extended by mutual consent of the two Parties after the five year period, and it must be renewed in writing.

This Memorandum of Understanding completed in English is hereby signed in two (2) copies with one (1) copy remaining in the possession of each institution.

Principal

Dr. Shiva Prasad Poudel

Bal Kumari College, Chitwan, Nepal

Barsh

Date: 2018/07/23

Act. Principal

Principal

Dr. P. R. Thorat,

Shri Shivaji Mahavidyalaya Barshi

Dist: Solapur.

Date: 2018/07/23

PRINCIPAL

Shri Shivoji Mahavidyalaya. Borshi, Dist. Solapur-413411.





#### BETWEEN

## COMMUNITY COLLEGE, SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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## SANGHAVI QUALITY PRODUCTS PVT. LTD., BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi, Dist-Solapur.

Shri Vinay Sanghavi Director, Sanghavi Quality Products Pvt. Ltd. Barshi Dist-Solapur

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Sanghavi Quality Products Pvt. Ltd. Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for two (02) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Dr. P.R. Phorat
PRINCIPAL
Shri Shivaji Mahavidyalaya,
Barshi, Dist. Solapur-413411.

Date: 25-06-2018

Barshi Parshi Vollagura 1341

Shri Vinay Sanghavi

Sanghvi Quality Products Pvt.Ltd, Plot No.84,85,87 Ind.Estate No.2,Barshi 413401, Dist.-Solapur (M.S.)

#### BETWEEN

# COMMUNITY COLLEGE, SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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#### VAISHNAVI AGRO, PRODUCTS, BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur. Shri Pradip Amritlal Bagmar Chairman, Vaishnaví Agro. Products. 69 Market yard, Barshi.

#### Article I

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Vaishnavi Agro. Products, Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
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Dr. P. R. Phorat
PRINCIPAL
Shri Shivaji Mahavidyalaya,
Barshi, Dist. Solapur-413411.

Barshi Say

Shri Pradip Amrittal Bagmar

Date: 24-06-2018

#### BETWEEN

Community College, Shri Shivaji Mahavidyalaya Barshi &

Laxmi Sopan Agriculture Produce Marketing Company Ltd. Barshi.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist-Solapur.

Shri Rajendra Vitthal Raut President, Laxmi Sopan Agriculture Produce Marketing Company Ltd. Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Laxmi Sopan Agriculture Produce Marketing Company Ltd. Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

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

Date: 23-06-2018

Shri Rajendra Vitthal Raut

#### BETWEEN

### COMMUNITY COLLEGE, SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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# Shri Lakshiminarayan Dal Mil, Barshi

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur Barshi Shri. Khatod Dilipji Vishanudas Shri Laxminarayan Dal Mil Old Railway Station Latur Road Barshi

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Shri Laxminarayan Dal Mil. Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
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#### Article 3

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

Date: 30-06-2018

Ratehi Nahaway

Shri. Khatod Dilipji Vishanudas

Laxminarayan Dal Mill

Partner

#### BETWEEN

# COMMUNITY COLLEGE, SHRI SHIVAJI MAHAVIDYALAYA BARSHI

### PUSHPAN IMAGING CENTRE, BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur.

Dr. V. N. Janrao Director, Pushpan Imaging centre Barshi, Dist-Solapur

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Pushpan Imaging centre Barshi..

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
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Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411.

Date: 23-06-2018

Way Maha

Dr. V. N. Janrao

Dr. Vivekanand N. Janrao Reg. No.68115 Pushpan Imaging Center M.D.(RAD.) 729/7/3+4+5+6/Ð, Kasarwadi Road.

BARSHI - 413 411

#### BETWEEN

# COMMUNITY COLLEGE, SIIRI SIIIVAJI MAHAVIDYALAYA BARSHI

&

## DR. JAGTAP PATHOLOGY LABORATORY, BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi, Dist- Solapur

Dr. R. V. Jagtap Director, Dr. Jagtap Pathology Laboratory, Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Dr. Jagtap Pathology Laboratory, Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
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#### Article 3

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Dr. P. R. | Thorat PRINCIPAL Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411. Bershi Volipur-4734

Dr. R. V. Jagtap

Jagtap Party, Laboratory Barchi Solapur.

Date: 25-06-2018

#### BETWEEN

## COMMUNITY COLLEGE, SHRI SHIVAJI MAHAVIDYALAYA BARSHI

S.

# Bhagwant Blood Bank, Barshi

Prin, Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi, Dist- Solapur Shri, Shishikant Jagdale Bhagwant Blood Bank Kurduwadi Road, Barshi,

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Bhagwant Blood Bank, Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines' regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for two (02) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Shri Shivaji Mahavidyalaya, Barshi, Dist. Salapur-413411.

Date: 27-0(-2019

Barshi Sa

Shri, Shishikant Jagdale

Sri Bhagwant Blood Bank Barshi- 413411

#### BETWEEN

# COMMUNITY COLLEGE, SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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# KARMVEER DR. MAMASAHEB JAGDALE HOSPITAL, BARSHI.

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur

Dr. R.V.Jagtap Medical Superintendent, Dr. Jagadale Mama Hospital Barshi Dist-Solapur

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Community College, Shri Shivaji Mahavidyalaya Barshi & Dr. Jagadale Mama Hospital Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines regarding the community college:

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
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#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for two (02) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Dr. P. R. Thorat PRINCIPAL Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411. Solapur - 13 - Solapu

Dr. R.V. lagtap Dr. Ramchandre Vineyak Jagtap Medical Superintendent Jagdale Mama Hospital, Barehi.

Date: 25-06-2018

This Memorandum of Understanding (MOU) has been entered into on this 27th day of August 2018

#### BETWEEN

Dept. of Physical Education & Dept. of Sanskrit, Shri Shivaji Mahavidyalaya, Barshi, through its representative Principal Dr. P. R.Thorat, (herein after called as 'Party on the First Part').

#### AND

Shri Ambika Yoga Kutir-Thane, through its representative Dr. Prasad Kulkarni, Branch-Barshi, Shri Ambika Yoga Kutir (hereinaster called as 'Party on the Second Part).

#### WHEREAS,

Party on the First Part is one of the leading educational institutions at Barshi imparting education through the streams of Arts and Science. Along with academic studies, today's youth also needs training for maintaining mental peace and sound health to face challenges in life. Therefore the UGC has decided to include "Yoga and Meditation" training programme in their syllabus. Party on the Second Part is a registered Public Charitable Trust - one of the leading Yoga Institutes in India accredited by Yoga Certification board under "AYUSH" Ministry, Government of India. Party on the First Part has approached the party on Second Part and both believe that collaboration and cooperation will promote more effective use of each of their resources and provide each of them with enhanced.

Opportunities and decided to co-operate and focus their efforts within the area of skill based training for health and fitness of students.

# NOW THEREFORE THESE PRESENTS WITNESS AND IT IS HEREBY AGREED BY AND BETWEEN THE PARTIES HERETO AS FOLLOWS:

- 1. Co-operation:
- 1.1 Party on the First Part and Party on the Second Part have common interests and objectives to promote physical and mental health and chalk out a programme which will be beneficial for the students and provide them base for future health and well-being.
- 1.2 Party on the First Part shall take care of the attendance, evaluation and examination of their students along with the party on the Second Part. Party on the Second Part will provide well trained teachers in the field of Yoga and Meditation.

Maliavin

2. Scope of MOU:

- 2.1 Yoga and Meditation Training: Party on the First Part shall arrange training programme for students and course co-ordinator along with required staff for attendance and maintain discipline of students.
- 2.2 Guest Lectures: If required, Party on the Second Part shall arrange guest lecturers for the students on the subject of 'Mental health and physical health.
- 2.3 Party on the first Part and Party on the Second Part will actively co-operate, co-ordinate actively engage each other in assessing

Physical, mental health, practical and theory of the students, delivery of training and assessment of students.

- 2.4 Reimbursement of Expenses: Party on the First Part shall reimburse the out of pocket expenses incurred by the faculties provided by the Party on the second part. The quantum of such expenses will be mutually decided by both the parties.
- 2.5 Both the parties to MOU shall obtain all internal approvals, consents, permissions and licences of whatsoever required for smooth functioning of programme.
- 3. Validity:
- 3.1 It is expressly agreed that Party on the First Part and Party on the Second Part shall act on Principal-to-Principal basis.
- 3.2 This MOU shall be valid till 5 years and will be renewed on mutually agreed terms thereafter.

IN WITNESS WHEREOF THE PARTIES HERETO HAVE EXECUTED THIS AGREEMENT SIGNED, SEALED AND DELIVERED by the Within named Shri Shivaji Mahavidyalaya Barshi, Through its representative Dr.P.R.Thorat, Principal:



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

In presence of

SIGNED, SEALED AND DELIVERED by the Within named shri Ambika Yoga kutir- Branch Barshi through its representative Dr. Prasad Kulkrni

In presence of:

#### BETWEEN

#### SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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## RRS Fertilizant, Barshi

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur

Rohan Rajendra Shelake Agalgaon, Bhoire-Babulgaon Road, Barshi.

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & RRS Fertilizant, Barshi

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for Five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

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

Dr. P. R. Thorat

Date: 04/09/2018

Rohan Rajeudra Shelake

Proprietor

#### BETWEEN

#### SHRI SHIVAJI MAHAVIDYALAYA BARSHI

&

# Dr. Yadav Hospital

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur

Dr. B. Y. Yadav Yadav Hospital, Baleshwar Naka, Barshi-413401

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Dr. Yadav Hospital Barshi.

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

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Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411

Dr. P. R. Thorat

Dr. B. Y. Yadav

Date: 07 (0 2018

D.R. B. Y. YADAV M.S.

Reg. No. 27191 YADAV HOSPITAL, BARSHI

#### BETWEEN

#### SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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# Raje Ramrao Mahavidyalaya, Jath

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur

Prin. Dr. V. S. Dhekale Raje Ramrao Mahavidyalaya, Jath, Dist: Sangalí

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Raje Ramrao Mahavidyalaya, Jath

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines. i) Guest lecturers invited, internship and on job training.

ii) Commitment on recruiting students and financial assistance provided to the college. iii) Curriculum alignment with industry requirements. iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for Five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

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

Prin. Dr. P. R. Thorat

Date: 03 12 2018

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Proprincipul
Propr

Prin. Dr. V. S. Dhekale

#### BETWEEN

# SHRI SHIVAJI MAHAVIDYALAYA BARSHI

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# Young Inspirators Network Sakal Media Pvt. Ltd. Solapur

Prin. Dr. P. R. Thorat Shri Shivaji Mahavidyalaya, Barshi. Dist- Solapur

Hon. Abhijeet Shinde YIN Reginal Officer Sakal Media Pvt. Ltd. Solapur

#### Article 1

The subject at present Memorandum of Understanding is the establishment of entrepreneurship and educational cooperation between Shri Shivaji Mahavidyalaya Barshi & Young Inspirators Network Sakal Media Pvt. Ltd. Solapur

#### Article 2

Both sides shall endeavor to favor as far as their financial means as per the UGC guidelines.

- i) Guest lecturers invited, internship and on job training.
- ii) Commitment on recruiting students and financial assistance provided to the college.
- iii) Curriculum alignment with industry requirements.
- iv) Other forms of co-operation made by mutual agreements.

#### Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for Five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

PRINCIPAL Shri Shivaji Mahavidyalaya, Barshi, Dist. Solapur-413411 Barahi Manor St.

Hon. Abhijeet Shinde

Hon. Abhijeet Shinde

Dr. P. R. Thorat

Date: 29.12.2018

# MEMORANDUM OF UNDERSTANDING/LINKAGE

This Memorandum of Understanding ('MOU')/ Linkage is between Department of Chemistry, K. N. Bhise Arts, Commerce and Vinayakrao Patil Science College, Vidyanagar, Bhosare represented herein by its Principal

#### AND

Department of Chemistry, Shri Shivaji Mahavidyalaya, Barshi represented by its Principal for establishing a link between these two organizations to enhance each other's educational, academic and research activities in mutually beneficial manner.

## Purpose

- 1. To organize conferences, workshops, seminars jointly
- 2. To exchange students for training and other academic purposes
- 3. To allow students and teachers to use laboratory and library facility
- 4. To arrange lectures for students to exchange knowledge

#### Conditions

- 1. Revision or Modification in the Memorandum of Understanding ('MOU')/ Linkage may be done by both the parties with mutual understanding
- 2. Memorandum of Understanding ('MOU'V Linkage may be terminated by giving the notice to each party before the actual expiry date
- 3. Memorandum of Understanding ('MOU')/ Linkage may be extended if both parties agree to continue it.

#### Duration

This Memorandum of Understanding ('MOU')/ Linkage will become effective from 01 Dec 2016 and will be terminated after five years

Head of the Department Head, Department of Chemistry KNBAC & VPS College, Bhosaro.

M. Sc. Ph. D.

Head, Dept. of Chemistry Shii Shivali Mahavidyalaya Barshi - 413411, Dist. Solapir

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

& Vinayas Principal . Circ Sais

Principal of the College PRINCIPAL

Shri Shivaji Mahavidyalaya, Barshi, Dist Solapur-413411.



### Between

# SHRI SHIVAJI MAHAVIDYALAYA, BARSHI

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# BHARATI VIDYAPEETH'S DR. PATANGRAO KADAM MAHAVIDYALAYA, SANGLI

#### Article 1

The subject at present Memorandum of Understanding is the establishment of a scientific and educational cooperation between Shri Shivaji Mahavidyalaya, Barshi, Dist: Solapur and Bharati Vidyapeeth's Dr. Patangrao Kadam Mahavidyalaya, Sangli

#### Article 2

Both sides shall endeavor to favor as far as their financial means allow them:

JENEM ILE

- Exchange of research ideas and methodology.
- Exchange of faculty, students and scientific information.
- Other forms of cooperation made by mutual agreements.

## Article 3

This memorandum of Understanding shall become effective from the date of its signing by the representatives of both institutions and shall remain in effect for five (05) years, and can be extended by the written mutual consents. Either side may terminate this agreement at any time by giving a written notice in six months advance to the other.

Principal Shri Shivaji Mabavidyalaya, Barshi Dist Solapur.

Date: 10 06 2015 50 Bar

Dr. D. G. Kanase)
Principal
Bharati Vidyapeeth's

Dr. Palangrao Kodem Mahaddyalaya, Sanel'

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