ANDHRA LOYOLA COLLEGE

AUTONOMOUS :: VIJAYAWADA - 520 008

Established : 1954

A CHRISTIAN MINORITY COLLEGE WITH CONSTITUTIONALLY PROVIDED RIGHT OF ADMISSION
(AN ISO 14001 : 2015 INSTITUTION)
THE ONLY COLLEGE IN BOTH THE TELUGU STATES TO HAVE BEEN RANKED AMONG
THE TOP 150 COLLEGES BY NIRF SINCE THE INCEPTION OF THE RANKING IN 2017
SELECTED UNDER THE STAR COLLEGE SCHEME OF DBT AND FIST PROGRAMME OF DST, GOVT.OF INDIA
SELECTED FOR ENHANCEMENT OF QUALITY AND EXCELLENCE UNDER RUSA BY MHRD, GOVT.OF INDIA

Functional MoUs ……at Andhra Loyola College

A College Dedicated to All-Round Development of its Students

DEPARTMENT OF LOGISTICS & RETAIL OPERATIONS

ANDHRA LOYOLA COLLEGE

(AUTONOMOUS) VIJAYAWADA - 520008

ESTABLISHED 1954 * ACCREDATED AT 'A' GRADE WITH CGPA OF 3.66/4.00 IN III CIRCLE BY NAAC ALL INDIA 94TH RANK IN 2021 BY NIRF GOVT OF INDIA

BRIEF REPORT
OF
ORIENTATION PROGRAMME ON PAID APPRENTICESHIP BY LSC (LOGISTICS SECTOR SKILL COUNCIL)

Academic Year 2020-21

The Department hosted an Orientation Programme on “Paid Apprenticeship for I year Students” Conducted by LSC (Logistics Sector Skill Council) held on 4th feb 2021

.

Objectives of the Programme

- To understand the apprenticeship programmme which is in the BBA Final Year as per curriculum offered by LSC (Logistics Skill Sector Council)
- To explore the opportunities available for a paid apprenticeship in Picker and Executive roles..
- To Create awareness on Criteria for Selection Process by Various Companies for paid Apprenticeship
- To Understand Rules and Regulations during an apprenticeship in the Concerned Companies.
- To understand the process of Termination due to Indiscipline behavior
- To discuss wide range of questions asked by students and provide comprehensive answers for enhancing students' clarity and understanding of apprenticeship opportunities.
- To know the different apprenticeship locations available in India and Procedure of relocation

Mr. Sandeep Kumar Presentation in Brief

The following areas are highlighted in this session

LSC History with MHRD

Fees payment to LSC

Duration of the Apprenticeship

Required Skillet for getting Apprenticeship In Reputed Companies

Contract generation & Transfer / relocation

Neighborhood companies

NAPS registration -student / candidate

Timings at work

Rules & Regulations at company (Termination of indiscipline)

Location change

Apprenticeship companies location (Cities)

Stipend Amount

Warehouse Roe (Picker Role) & Executive Role

Difficulty in Job Role

LSC History with MHRD

Logistics Sector Skill Council (LSC), established by the Ministry of Skill Development and Entrepreneurship (MSDE) through National Skill Development Corporation of India (NSDC), has launched Apprenticeship-based higher education programmes both in humanities and technology disciplines with the primary objective of creating adequate skills for gainful employment at various levels of managerial cadre in Logistics Industry.

The core focus of the programmes is Skill Development, through on-the Job Training in the form of Industry Apprenticeship.

Fees payment to LSC

Payment of fees to LSC should be made according to the specified schedule and guidelines. Every College has to Pay Prescribed fee to LSC within the time.

If failure to pay the fee could pose various problems for the college, ultimately leading to direct negative impacts on the students.

Duration of the Apprenticeship

Two years in the Campus (College) and the final year in apprenticeship, where the real-world experience comes to life.

Required Skillet for getting Apprenticeship

LSC will allocate an apprenticeship to you in a logistics company.LSC is capable of providing good number of opportunities regarding Apprenticeship in reputed Companies in India but Student responsibly is to clear the Interview.

Major Skills required for Interview

1. Conceptual Skills
2. Communication Skills
3. Computer Skills especially in MS Excel

Contract Generation &Transfer / Relocation

LSC is responsible for generating contracts for students getting apprenticeship in the Companies. Students are required to adhere to the rules outlined in the Contract Agreement during their apprenticeship.

Transfer or relocation may be necessary for apprenticeship; it is depending on the Student requirements and based on the Company Policy.

NAPS registration -student / candidate

If you wish to pursue an apprenticeship near your area or if your relatives working in that company, it's essential to verify whether that company is registered under the National Apprenticeship Promotion Scheme (NAPS).

If you want to do Apprenticeship near to your area or your Relatives are working in that Particular Company you need to verify whether that Company registered in National Apprenticeship Promotion Scheme (NAPS). If it's not registered, you can request them or ask them to register with NAPS."

Timings at work

The apprenticeship program at the company typically involves a substantial daily commitment, with participants expected to dedicate themselves to work for a period spanning from 9 hours to up to 12 hours, allowing them to gain a comprehensive understanding of the industry and develop valuable skills during their tenure.

Rules & Regulations at company

In accordance with the company's rules and regulations, students are required to adhere to them diligently; failure to do so may result in corrective actions, including disciplinary measures, being taken by the company authorities.

Location change

While typically, there is no flexibility to change the location once the contract has been generated in the student's name by the company, in cases where the company is favorable to facilitating transfers or changes in location, that time will have a chance for changing without any complications.

Apprenticeship companies location (Cities)

LSC offers students the opportunity for paid apprenticeships in thriving metropolitan hubs such as Bangalore, Mumbai, Chennai, Gurgaon, Delhi, Kolkata, and Hyderabad, providing a valuable stepping stone to their professional journey.

Stipend Amount

Minimum Apprenticeship Payment is Rs 7,500, Maximum based on the Student Performance in the Interview and based on the Company. A reputed company like ‘Bosch’ is giving good amount of Apprenticeship but Student has to clear all rounds in the Interview.

The Minimum Apprenticeship Payment of Rs 7,500 serves as a foundation, while the maximum amount, determined by student performance in the interview can provide substantial opportunities for growth; companies like 'Bosch' exemplify this by offering generous apprenticeship packages, provided students excel in all interview rounds.

Warehouse Role (Picker Role) & Executive Role

Those exceptionally capable students are destined to be positioned for prestigious executive roles within the organization.

Students showcasing their exceptional capabilities are destined for executive roles for Apprenticeship within the organization

If Students are lacking conceptual skills, communication skills, and technical abilities will place in Warehouse as Picker Role

Hence Students must ardently strive to work hard for developing the following skills.

1. Conceptual Skills
2. Communication Skills
3. Computer Skills especially in MS Excel

Difficulty in Job Role

Student life is happier in the College days or in the Hostels, even at home. Majority of the Students have no Problems, no worries and everything seems to be happy but once if you want Join in the Apprenticeship you have to lose your Comforts in terms of away from home, working long Hours, hard work, and many more.

Being away from home for my apprenticeship has allowed to you gain valuable skills working hard during the initial days in Apprenticeship sets a strong foundation for success of the Students.

Assessment Test

The Continuous Internal Assessment (CIA) Component of Apprenticeship is assessed by the Manager / Supervisor under whom the students work during Apprenticeship Semesters and LSC for a maximum mark of 250. The Manager / Supervisor makes the assessment for 150 marks based on skill & attitudinal development of students. LSC assess the practical knowledge of students for 100 marks by conducting a Test on conceptual knowledge relevant to the process undergone during Apprenticeship, and Viva.

The Collaborating Institution evaluates the Apprenticeship Report (comprising Work Diary) submitted by students, and conduct Viva for a mark of 150, which is considered as End Semester Examination (ESE). The Evaluation & Viva is conducted by a Panel comprising of the HoD (or Programme Coordinator), Student's Mentor, and an Executive from Logistics Sector.

After MBA will LSC provide placements - depends on situation

LSC Continuous supports to you and provides placements after MBA will depend on the prevailing situation and demand in the job market.

Mail Conversations regarding Apprenticeships for students

Regarding Final placement & apprenticeship
Inbox
Search for all messages with label Inbox
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Mon, Jul 11, 2022, 2:15 PM

Alc Logistics <alclogistics2020@gmail.com>

to Sandeep, Akshaya, Koppula, vaishnavitungala

Respected sir/ ma'am

I'm writing this mail to enquire about three aspects. Firstly, the Logistics 2019-20 batch students' Final Placement process & its update. Then the Logistics 2020-21 batch students' relieving date from the apprenticeship because these students need to attend the Regular classes which will commence from 18th July 2022. And finally the E-commerce operations 2020-21 batch students' apprenticeship interview update.

We are getting continuous calls and enquiries from the students as well as their parents regarding these aspects. I would be grateful if you could give us some information about the same.

Kindly do the needful

Warm Regards
Vaishnavi T
HOD
LOGISTICS DEPARTMENT
ALC

Mon, Jul 11, 2022,
2:39 PM

Sandeep LSC <sandeep@lsc-india.com>

to Ravi, me, Akshaya, Koppula, vaishnavitungala

Fwd: consolidated excel sheet regarding the 2021 batch apprenticeship allocation

Inbox

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2:17 PM (27 minutes ago)

afsal ti <afsalti13@gmail.com>

---------- Forwarded message ---------
From: **afsal ti** <afsalti13@gmail.com>
Date: Tue, 6 Jul, 2021, 12:55
Subject: Re: consolidated excel sheet regarding the 2021 batch apprenticeship allocation
To: Ravi Guzzu <ravig@lsc-india.com>

Respected Sir,

Kindly find the updated sheet sir (2021 batch consolidated one)

Afsal ti

Ph: 09061372240

On Tue, Jul 6, 2021 at 10:27 AM afsal ti <afsalti13@gmail.com> wrote:

Respected Sir,

Kindly find the consolidated excel sheet regarding the 2021 batch apprenticeship allocation for students. We have allotted 40 out of 40 students in the 2021 batch.

Afsal ti

Ph: 09061372240

One attachment • Scanned by Gmail

Students Allocation for Apprenticeship

ANDHRA LOYOLA COLLEGE (AUTONOMOUS) :: VIJAYAWADA

No.	*Student Name*	*Apprenticeship Registration No.*	*Company*	*Location*
1	Dondapati ira namratha roshan	A052116345	Ecom Express	Gannavaram
2	Jaggemanje Sreekanth Naik	A052116704	Mahindra Logistics	Hyderabad
3	Adda Mohan Manikanta	A052116604	Mahindra Logistics	Chennai
4	Kalapala Santhi swaroop	A052133014	Mahindra Logistics	Hyderabad
5	Gujjula Bala Raja Shekhar Reddy	A052117293	Mahindra Logistics	Hyderabad
6	Mattaparthi Sai teja	A052116624	Ecom Express	Gannavaram
7	Veerla Lakshmi sai Sumanth	A052116340	Mahindra Logistics	Hyderabad
8	Kancharla sai gagan Manikanta	A052116686	Ecom Express	Gannavaram

9	Abhinav Reddy Siddhareddy	A052116389	Ecom Express	Vijayawada
10	Bhogaraju Sri Vaishnavi	A052116490	Ecom Express	Gannavaram
11	Nandipati Dinesh Gandhi	A052116442	Ecom Express	Gannavaram
12	Kanigiri Pavan Kumar	A052116644	Mahindra Logistics	Hyderabad
13	Bendadi Tarun	A052116595	Mahindra Logistics	Bangalore
14	Sanka Sai Nikhil	A052116569	Mahindra Logistics	Hyderabad
15	Gandikota Vishnu kalian	A052117165	Ecom Express	Vijayawada
16	Karri Sai Subhakar Reddy	A052116357	Ecom Express	Vijayawada
17	Shaik Arshad Basha	A052116700	Mahindra Logistics	Hyderabad
18	Boggavarapu Vineeth Bhaskar	A052116552	Mahindra Logistics	Chennai
19	Thamanam Sachin Anup Chand	A052116570	Mahindra Logistics	Bangalore
20	Tekyam Jayanthi Akshitha	A052116344	Ecom Express	Gannavaram
21	Yeruva Sahitya Vrunda	A052116482	Ecom Express	Gannavaram

22	Chidalla Sasi Preetham	A052116351	Ecom Express	Vijayawada
23	Shaik Hamadjani	A052116892	Mahindra Logistics	Hyderabad
24	Boggavarapu Leela Venkata Naga Sai	A052116401	Mahindra Logistics	Hyderabad
25	Bikkavolu Kishore Vara Kumar	A052116619	Mahindra Logistics	Hyderabad
26	Polinati Nagendra Vijaya Saradhi	A052116375	Mahindra Logistics	Hyderabad
27	Kekho Kongnyu	A0421109021	Mahindra Logistics	Hyderabad
28	Uppu Shanmukha	A052116858	Mahindra Logistics	Hyderabad
29	Unthakal Sai Goutham	A052116333	Ecom Express	Vijayawada
30	B praveen Kumar	A052116373	Mahindra Logistics	Bangalore
31	Gangupam Mahesh	A052117084	Mahindra Logistics	Hyderabad
32	Buradagunta Surya Teja	A052116420	Mahindra Logistics	Bangalore

33	Eda Srikar Reddy	A052116421	Mahindra Logistics	Bangalore
34	Abhinav Neware	A052116677	Mahindra Logistics	Hyderabad
35	Tikkisetti Srikanth	A052116337	Mahindra Logistics	Hyderabad
36	Gummadidala Subhani	A052116791	Mahindra Logistics	Hyderabad
37	Thorrukonda Rupesh Babu	A052116382	Ecom Express	Vijayawada
38	Bhavanasi Venkata Narayana	A052116401	Mahindra Logistics	Hyderabad
39	Chakrala Vamsi Krishnam Raju	AO52118711	Mahindra Logistics	Hyderabad
40	Gandu Harish	A052116425	Mahindra Logistics	Hyderabad

Mail Conversations regarding **MOOC & Degree Apprenticeship Assessment**

Fwd: First Spell Apprenticeship Assessment-MOOC &Practical Results-2020-21 Batch-ALC

Inbox
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Akshaya LSC

Mon, Jan 22, 10:27 AM

to me, Controller

Dear Sir,
Please find the attached 2020-21 batch - Spell I result.

Thanks and Regards,
Akshaya Sundar
Logistics Sector Skill Council
480 A , 7th floor, Khivraj Complex, Tower 2
Anna Salai, Nandanam, Chennai-600 035
Mobile: 9500166651

---------- Forwarded message ---------
From: **Controller of Examinations LSC** <coe@lsc-india.com>
Date: Thu, Apr 14, 2022 at 2:13 PM
Subject: First Spell Apprenticeship Assessment-MOOC &Practical Results-2020-21 Batch-ALC
To: <babubujjin@gmail.com>, Srirangam Mathew, Prof. <srirangam_mathew@yahoo.com>, <contactalc@gmail.com>, <alscounsellor.vijayawada@gmail.com>, <itsmekoppula@gmail.com>
Cc: Prof. S. Ganesan <prof.ganesan@lsc-india.com>, Akshaya LSC <akshaya@lsc-india.com>, Sandeep LSC <sandeep@lsc-india.com>

Dear Prof,

Greetings.

I attach the results of Examinations conducted in the Third Semester for Batch 2020-21 for the following Courses.

Semester	Course Code	Course Name
III	L19A01A	Warehouse Automation
	L19A01B	Best Practices in Transportation
	L19C08	Materials Management – Practical
	L19C09	Warehousing Management – Practical
	L19C10	Apprenticeship – I

The reappearing/arrear exam will be scheduled with the fourth-semester exams.

Kindly share the list of students who need to reappear for the arrear exam as per your university/institution norms on or before 30-04-2022.

Kind regards,

Dr Gayathri H

CoE, EID-LSC

Certificates of Apprenticeship

Skill India
कौशल भारत-कुशल भारत

LSC
Logistics Skill Council

Logistics Sector Skill Council

NAPS

Registration No. **A052116700** Contract No. **CN102119365**

PROVISIONAL CERTIFICATE

Mr. / Ms. **Shaik Arshad Basha**

Mother's/ Father's / Guardian Name **Shaik Ansar Basha**

Date of Birth **29-10-2002** having completed the apprenticeship training as part of their Degree Programme **BBA in Logistics** at **Logskim - Mahindra Logistics**

Address **Hyderabad** District **Hyderabad** State **Telangana** in the Optional Trade of **Warehouse Executive (Receipts and Dispatch)** under Logistics Sector, Confirming to NSQF level **4** From **26-09-2021** To **24-03-2022**

He/she passed the prescribed test conducted by the establishment held in the month of **Mar-22** is awarded this certificate provisionally. The apprenticeship certificate will be issued by the appropriate authority. The total number of academic credits allocated for Apprenticeship - I is 22 credits. His/her Performance during the period of training is **Very Good**

Head of Apprenticeship

Skill India
कौशल भारत - कुशल भारत

LSC
Logistics Skill Council

Logistics Sector Skill Council

NAPS

Registration No. **A052116569**

Contract No. **CN022206363**

PROVISIONAL CERTIFICATE

Mr. / Ms. **Sanka Sai Nikhil**

Mother's/ Father's / Guardian Name **Santhosh kumar**

Date of Birth **15-07-2002** having completed the apprenticeship training as part of their Degree Programme **BBA in Logistics** at **Logskim - Mahindra Logistics** Address **Hyderabad** District **Hyderabad** State **Telangana** in the Optional Trade of **Warehouse Executive (Receipts and Dispatch)** under Logistics Sector, Confirming to NSQF level **4** From **21-01-2022** To **19-07-2022**

He/she passed the prescribed test conducted by the establishment held in the month of **Jul-22** is awarded this certificate provisionally. The apprenticeship certificate will be issued by the appropriate authority. The total number of academic credits allocated for Apprenticeship - I is 22 credits. His/her Performance during the period of training is **Very Good**

Head of Apprenticeship

Skill India
कौशल भारत - कुशल भारत

LSC Logistics Skill Council

NAPS

Logistics Sector Skill Council

Registration No. **A052116442** Contract No. **CN092144593**

PROVISIONAL CERTIFICATE

Mr. / Ms. **Nandipati Dinesh Gandhi**

Mother's/ Father's / Guardian Name **Devanand Kumar**

Date of Birth **07-09-1998** having completed the apprenticeship training as part of their Degree Programme **BBA in Logistics** at **Logskim - Ecom Express**

Address **Vijayawada** District **Vijayawada** State **Andra Pradesh** in the Optional Trade of **Warehouse Executive (Receipts and Dispatch)** under Logistics Sector, Confirming to NSQF level **4** From **10-09-2021** To **08-03-2022**

He/she passed the prescribed test conducted by the establishment held in the month of **Mar-22** is awarded this certificate provisionally. The apprenticeship certificate will be issued by the appropriate authority. The total number of academic credits allocated for Apprenticeship - I is 22 credits. His/her Performance during the period of training is **Very Good**

Head of Apprenticeship

Memorandum Of Understanding
Between
Andhra Loyola College , Vijayawada
And
Efftronics Systems Pvt Ltd

This Agreement made and entered into on 21-sep-2021 between Andhra Loyola College, Vijayawada and Efftronics Systems Pvt Ltd (here in after called Efftronics) situated at IT Park, Mangalgiri (A.P.). This MOU shall be valid for 3 years from the date and each party shall be at full liberty to terminate the collaboration with a notice period of 3 months.

Objectives of the MOU:

The objective of this Memorandum of Understanding is:

A. To promote interaction between **Andhra Loyola College, Vijayawada** and Efftronics in mutually beneficial areas.
B. To provide a formal basis for initiating interaction **Andhra Loyola College, Vijayawada** and **Efftronics.**

Proposed Modes of Collaboration:

Andhra Loyola College, Vijayawada and Efftronics propose to collaborate through

1. Exchanging of expertise by means of Guest Lectures, Technical Seminars, Workshops and other events (during regular working days) for the benefit of the faculty and students.
2. Permitting students for One-day Industrial Visit.
3. Allowing faculty & Staff for industrial training.
4. Permitting Practical training to students.
5. Share expertise in framing the curriculum for the Vocational courses
6. Attending campus recruitment where the intake depends up on the clearance of all the rounds by the candidate in selection process.

Note: All the above modes will be decided upon mutual consent based on Availability, Work Schedules and Manpower of Company.

Date of Agreement: 21-Sep-2021

With Regards

For Efftronics Systems Pvt. Ltd.,	**Andhra Loyola College, Vijayawada**
Spurthi	
(SPURTHI D)	**( )**
HR MANAGER	**PRINCIPAL/DIRECTOR**

Gmail **Loyola Electronics Dept LED <loyolaelectronicsdept@gmail.com>**

Shortlisted Students List For Internship @ Loyola College --

1 message

hr <hr@efftronics.com> Mon, Oct 14, 2019 at 1:55 PM
To: Loyola Electronics Dept LED <loyolaelectronicsdept@gmail.com>
Cc: SPURTHI DASARI <spurthi@efftronics.com>

Dear Sir,

Greetings from Efftronics...!!!!!

Given below candidates are shortlisted for Internship program.
Candidates has to join on schedule date without fail .

Slno.	Name	Mobile no.	Role	Stage	Date		Duration
					From	To	
1	Nagul Shaik	7997795612	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
2	Narasimhulu Chari N	8464808420	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
3	Nakka Subhakar	9182747037	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
4	Subba Reddy	6304737682	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
5	Tharun Sai	9154225514	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
6	Chunduri Gopal	8179393606	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
7	Vamsi Krishna	8555892855	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
8	Arshad Shaik	7396073084	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
9	Kunpareddy Chaitanya	7702822430	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
10	Vusa Rakesh	9493447898	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
11	Nemani Ravi Kumar	8790290411	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
12	Rawoof Sk	9603114494	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months
13	Vatrapu Krishna Sai Naga Venkata Reddy	9398501265	Internship Technician	To be Joined	15-Nov-19	15-Apr-20	6 months

If any queries please let us know

Thanks and regards
Madhavi P
7893552233

On 13-10-2019 22:46, Loyola Electronics Dept LED wrote:

> Respected Sir/Madam,
>
> Greeting from Andhra Loyola College, Vijayawada
>
> Thanks for collaboration with Andhra Loyola College, Electronics Department. We would like to continue this relation with your esteemed organization regarding internship.

We are once again very thankful to you for accepting our request to appear for the test for internship in your esteemed organization from November 4th,

Already our final year B.Sc. Students of 20 in number appeared for the Written examination on 4th October 2019 (Friday) morning at your office after 9 am. The students list is enclosed here with this in excel file

Duration of Internship: Nov. 1st week of 2019 to March 2nd week of 2020.

I request you to kindly intimate the list of qualified candidates for the Internship.

Thanking you and with regards,

--

Dept. Of Electronics
Andhra Loyola College
VIJAYAWADA - 8

Gmail

Loyola Electronics Dept LED <loyolaelectronicsdept@gmail.com>

Shortlisted candidates Reporting to Efftronics @ 01-Mar-2021

1 message

hr <hr@efftronics.com> Fri, Feb 26, 2021 at 5:48 PM
To: "loyola electronicsdept"@gmail.com
Cc: SPURTHI DASARI <spurthi@efftronics.com>, NAVYA <gnavyasri@efftronics.com>, pvnmprasad@efftronics.com

Dear Sir,

Greetings From Efftronics !!!!!!

As per our telecon here with attached the candidates details and their reporting office on 01-Mar-2021

Thanks and Regards

Madhavi P
HR Executive
Efftronics

On 20-02-2021 17:59, hr wrote:

> Dear Sir,
>
> Good day to you..!!
>
> Below is the List of Candidates Shortlisted For Industrial Training for the period of 3 Months from 1-Mar-2021 to 31-May-2021.

S No	Candidate	Email	Mobile	College	Qualification	Specialization
1	Akhila Kotla	akhilakotla1234@gmail.com	6303935874	Andhra loyola	BSC	Electronics
2	B. Sai Mohith	mrmohith32@gmail.com	8184991742	Andhra Loyola college	BSC	Electronics
3	Durga Prasad Kollu	durgaprasadkollu1434@gmail.com	8309690638	ANDHRA LOYOLA COLLEGE	BSC	Electronics
4	Kaparapu Sai	loyalite183756@gmail.com	9676396644	ANDHRA LOYOLA COLLEGE	BSC	Electronics
5	Nataraju Sarikonda	technology183737@gmail.com	7032981712	Andhra Loyola College	BSC	Electronics
6	Naveen Gudavalli	gudavallinaveen2342@gmail.com	9182516248	Andhra Loyola College, Vijayawada	BSC	Electronics
7	P.Seshasai Krishna	seshasaikrishna41337@gmail.com	9032273225	Andhra Loyola College	BSC	Electronics
8	Palanki Hemanth Kumar	hemanthnaidupalanki@gmail.com	8897010344	Andhra Loyola college	BSC	Electronics
9	Parimi Venkateswarlu	venkychowdary43@gmail.com	8790020964	Andhra Loyola College	BSC	Electronics
10	Pavan Kumar Munganda	technology183757@gmail.com	7995630669	Andhra Loyola College	BSC	Electronics
11	Pavanteja Mopidevi	pavantejamopidevi198@gmail.com	9494198453	ANDHRA LOYOLA COLLEGE	BSC	Electronics
12	Praneetha Dronamraju	praneethadronamraju.09@gmail.com	9014888236	Andhra Loyola College	BSC	Electronics
13	Raja Perikala	raja.perikala.nph@gmail.com	7989205773	ANDHRA LOYOLA COLLEGE VIJAYAWADA	BSC	Electronics
14	Reshma Valluri	reshmavalluri47@gmail.com	7993439002	Andra Loyola college	BSC	Electronics
15	Sandeep Chatragadda	sandeepchatragadda007@gmail.com	7780127249	Andhra loyola college	BSC	Electronics
16	Shaik Afzal	afzal.sk2000@gmail.com	7032852724	Andhra Loyola College	BSC	Electronics
17	Sriram Kumar	Sriramkumarpunnana2000@gmail.com	6281047689	Andhra loyola degree college	BSC	Electronics
18	Hemapriya Kocharla	hemapriyakocharla04@gmail.com	9505461482	Andhra loyola college	BSC	Electronics
19	Yaswanth Sai	yaswanthsaivarada@gmail.com	9059315110	Andhra Loyola College	B.sc	Electronics
20	Nadakuditi Chandra Shekara Varma	varmanadakuditi2210@gmail.com	9603549686	Andhra Loyola College	B.sc	Electronics

with regrads,
G Navya sri.

Talent Acquisition Team,
Efftronics Systems Pvt Ltd,
Opp.Microwave Towers,
Benz Circle, Vijayawada,
Andhra Pradesh 520010.

Andhra Loyola College.xlsx
12K

Materials Science in Semiconductor Processing

Vermiwash derived enzymes activated ZnO nanomaterial towards two cascading applications:Enhanced photocatalysis and effective irrigation

--Manuscript Draft--

Manuscript Number:	
Article Type:	Research Paper
Section/Category:	Photocatal*
Keywords:	Vermiwash, Enzymes, Photocatalysis, Dye degradation, ZnO nanomaterial
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Abstract:	This study focuses on the preparation of enzyme activated zinc oxide nanomaterial using vermiwash via a simple soft chemical method. This vermiwash - an aqueous extract obtained from vermin reactor - is produced using earthworm, Eudrilus eugineae, cow dung and leaf litter. The prepared nanoproduct was used to decompose toxic dye molecules through photocatalysis. The enzymes present in the vermiwash (like amylase, phosphatase, urease and protease) are found to be inherited by the prepared nanoproduct as well as the photocatalytically treated water. The quantitative study of enzymes shows that the quantity of enzymes present in the nanoproduct as well as in the photocatalytically treated water increases as the proportion of vermiwash used in the starting solution increases. This increase in the quantity of enzymes causes an increase in the photocatalytic efficiency of the nanoproduct. The photocatalytically treated water which consists of enzymes can be used as a potential candidate for effective irrigation. Thus, the vermiwash activated ZnO nanopowder prepared in this study shows a two linear cascading applications. The results of the studies on enzymes, photocatalysis, XRD, SEM and FTIR are appropriately correlated with one another to address the enhancement in the photocatalytic activity of the prepared nanomaterials and the underlying mechanism.

<u>Covering Letter</u>

Dear Editor,

Herewith I have sent our original research paper entitled ***" Vermiwash derived enzymes activated ZnO nanomaterial towards two cascading applications: Enhanced photocatalysis and effective irrigation"*** for your kind perusal. The work described has not been published before; it is not under consideration for publication anywhere else. I request you to consider our manuscript for publication in your esteemed journal. Please do the needful as early as possible.

Thanking you,

With regards,

Dr. K. Ravichandran
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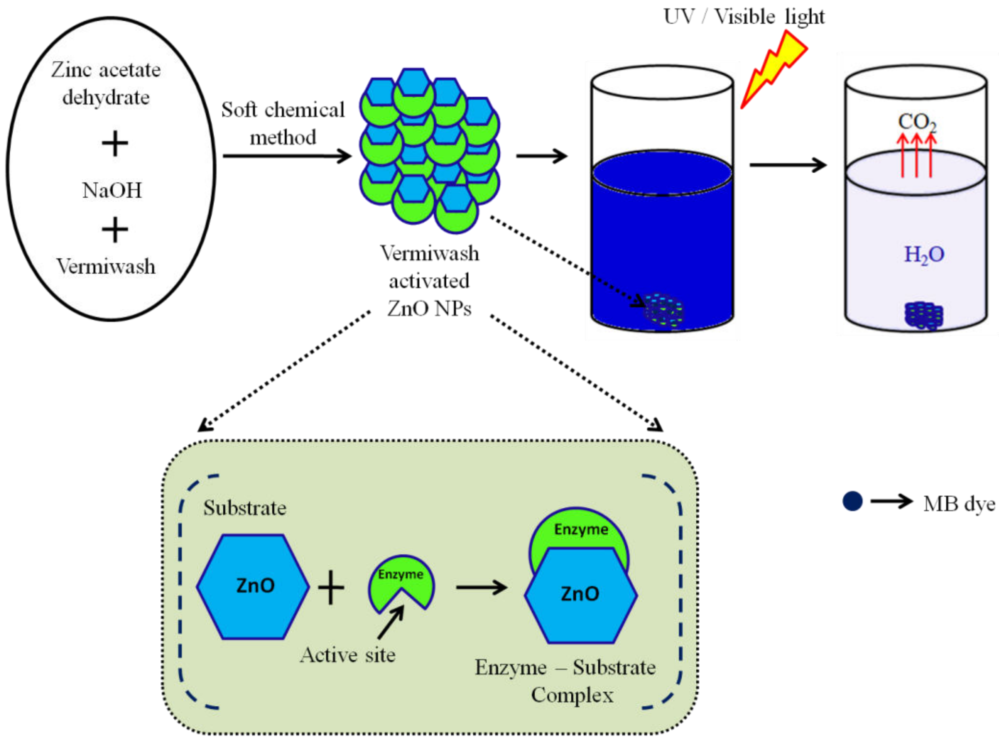
Thanjavur-613 503,
Tamil Nadu, India.

Highlights

- Synthesis of enzyme activated ZnO nanomaterials using vermiwash for enhanced photocatalytic activity for the first time.
- Notable enhancement in photocatalytic efficiency with increasing vermiwash proportion.
- Realisation of two cascading applications through enzyme inheritance by both nanoproducts and photocatalytically treated water.

Graphical Abstract



Conflict of interest

Authors declare that there is no conflict of interest involved in the current work.

I, K. Ravichandran, the communicative author herewith declared that, this manuscript entitled "***Vermiwash derived enzymes activated ZnO nanomaterial towards two cascading applications:Enhanced photocatalysis and effective irrigation"*** has not been submitted elsewhere and has not be considered elsewhere for publication. Its submission and publication is approved by all the authors in the list.

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Vermiwash derived enzymes activated ZnO nanomaterial towards two cascading applications:Enhanced photocatalysis and effective irrigation

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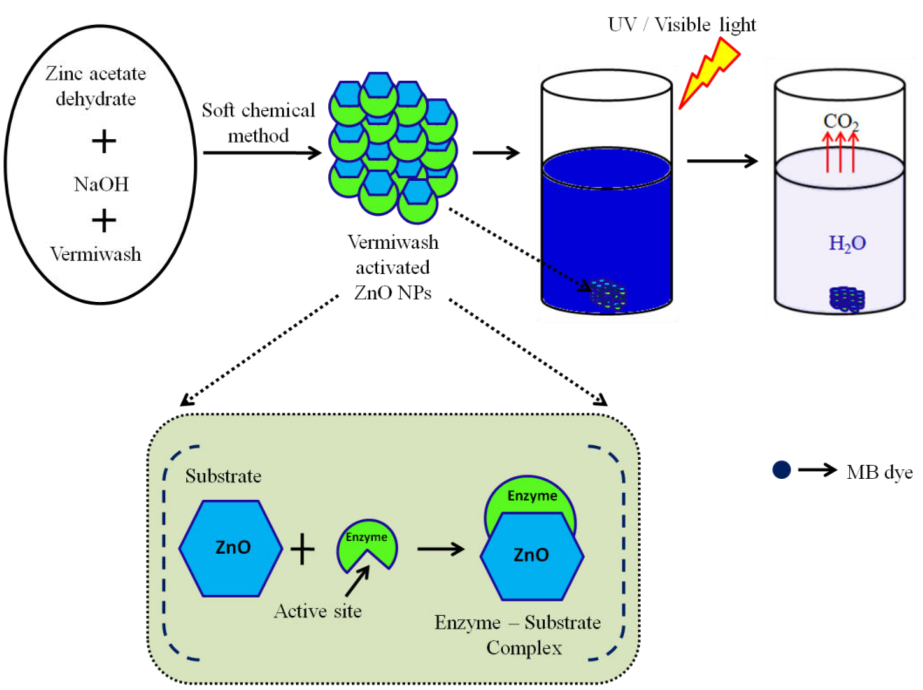

Abstract

This study focuses on the preparation of enzyme activated zinc oxide nanomaterial using vermiwash via a simple soft chemical method. This vermiwash - an aqueous extract obtained from vermin reactor - is produced using earthworm, Eudrilus eugineae, cow dung and leaf litter. The prepared nanoproduct was used to decompose toxic dye molecules through photocatalysis. The enzymes present in the vermiwash (like amylase, phosphatase, urease and protease) are found to be inherited by the prepared nanoproduct as well as the photocatalytically treated water. The quantitative study of enzymes shows that the quantity of enzymes present in the nanoproduct as well as in the photocatalytically treated water increases as the proportion of vermiwash used in the starting solution increases. This increase in the quantity of enzymes causes an increase in the photocatalytic efficiency of the nanoproduct. The photocatalytically treated water which consists of enzymes can be used as a potential candidate for effective irrigation. Thus, the vermiwash activated ZnO nanopowder prepared in this study shows a two linear cascading applications. The results of the studies on enzymes, photocatalysis, XRD, SEM and FTIR are appropriately correlated with one another to address the enhancement in the photocatalytic activity of the prepared nanomaterials and the underlying mechanism.

Keywords: Vermiwash, Enzymes, Photocatalysis, Dye degradation, ZnO nanomaterial

1. Introduction

Toxic organic dye molecules prevalent in the textile, leather and paper industrial effluents become one of the major causes of environmental damages, especially the infertility of agricultural lands, when the untreated effluents are discharged into the downstream. Decomposition of these toxic dye molecules and reclamation of the already affected lands are two pressing issues to be sorted out effectively.

In the present study, the following hypothesis is framed to tackle both these problems: by adopting enzyme activated semiconductor photocatalysis, the toxic dye molecules can be decomposed effectively and the water obtained as the final product of the photocatalytic treatment (which consists of residual enzymes) can be used for the reclamation of the affected lands.

Even though several conventional methods are available, photocatalysis is considered as one of the best potentially important approaches for the decomposition of toxic organic molecules. Semiconductor materials like TiO_2 and ZnO can be used as photocatalysts for this application. When these semiconductor materials are prepared in nanostructured form, they exhibit better photocatalytic activity than their bulk counterparts [1-5].For the preparation of photocatalytic nanomaterials through chemical methods, in general, NaOH is used as a reducing as well as stabilizing agent. Now-a-days, several researchers use plant extracts, fungi and algae as eco-friendly reducing agents along with NaOH [6,7].

The efficiency of photocatalysts can be improved by adding suitable co-catalysts that can support oxidative and/or reductive catalysis. Recently, biophotocatalysis, a process that couples photocatalysts with enzymes has attracted the attention of researchers working in this field. Macia Agullo *et al*, analyses the possibilities of developing eco-friendly and effective photocatalyst systems by combining the enzymes with photocatalytic materials [8].

Keeping these points in mind, in the present study, vermiwash, a liquid extracted from earthworm culturing unit is used along with NaOH as the enzymes present in the vermiwash can act as reducing as well as stabilizing agents. Moreover, it is well known that the enzymes like amylase, phosphatase, urease and protease present in the vermiwash can play a vital role in improving the quality of soil in the agricultural lands and thereby enhancing the growth of the crops. The enzymes help maintain the temperature, moisture, pH and organic contents of the soil [9 - 11]. Suganya *et al.,* reported that when vermiwash is used as a reducing agent, the resultant ZnO nanoparticle gives better seed germination [12].

To realize the proposed hypothesis, four different sets of ZnO nanoparticle samples were prepared using different concentrations of vermiwash in the starting solution and the effect of concentration of vermiwash on the photocatalytic activity of the resultant nanomaterial was studied by performing dye (methylene blue) degradation experiments. As a supporting investigation, the existence of enzymes in (i) the vermiwash (ii) the prepared nanomaterial and (iii) the photocatalytically treated water was also studied.

2. Experimental studies

2.1 Preparation of vermiwash

A custom-made vermin reactor setup using broken bricks, pebbles, sand and loamy soil for this study is shown in Fig.1. Cow dung (4 kg) with leaf litters (4 kg) were filled in the reactor along with earthworms (*Eudrilus eugineae*) numbering 200 [12,13]. Vermiwash-an aquous extract - was obtained from the 15 days old vermicompost produced by the composting of leaf litter along with cow dung using earthworms .

2.2 Preparation of nanopowder

Four sets of aqueous solutions were prepared by dissolving 5 g. of the zinc acetate dehydrate with water and vermiwash. The proportions of vermiwash and water in the solutions were kept as 0+500, 100+400, 200+300 and 300+200 and the corresponding samples were designated as $S_{0:5}$, $S_{1:4}$, $S_{2:3}$ and $S_{3:2}$. The pH value was maintained as 9 by adding required amount of NaOH drop by drop with the solutions. The solution was heated up to 85 °C and magnetically stirred for 2 h. The precipitate formed was separated after 24 h and dried at room temperature to get the final product [14](Fig. 2).

2.3 Photocatalysis process

For photocatalytic dye decomposition experiments, 15 mg of the prepared vermiwash activated nanopoweder was dissolved in 100 ml of methelene blue dye solution (1×10^{-5}mol/L). This dye solution is kept dark for 30 minutes so that the solution attains equilibrium for adsorption and desorption. Then, the solution is exposed to light irradiation from tungsten lamp (500W) in an annular type co-axial photoreactor in which water circulation in an outer tube controls the temperature. The test solution was stirred continuously using bubbled air flow arrangement. At regular intervals of 15 min, aliquot (5 ml) was taken from the test solution and using UV-vis-NIR double beam spectro photometer, the absorption spectra were recorded to analyze the dye degradation efficiency and rate constant of the prepared vermiwash activated nanoproduct [15].

2.4 Quantitative analysis of enzymes

2.4.1 Amylase

The enzyme, amylase was quantified by a method described by Bernfeld [16]. In this method, 50 µl of the sample was mixed with 50 µl of 100 mMTris-HCl (pH 7.0) and 100 µl of 1% starch (pH 7.0). This mixture was allowed for incubation at 40ºC for 30 minutes. In order to stop the reaction, 200 µl dinitrosalicylic acid (DNS) was added to the mixture. After mixing by whirling, it was heated at 100°C for 5 min, followed by the addition of 2 ml of distilled water. The absorbance was measured at 540 nm and the amount of amylase was calculated using the following formula.

$$\text{Amylase present in the sample} = \frac{\text{OD (test)}\times\text{concentration of Std (µmoles)}\times\text{dilution of sample}}{\text{OD (std)}\times\text{incubation time (3 min)}}$$

2.4.2 Protease

The estimation of the quantity of protease was carried out by following the method suggested by Tsuchida*et al* [17], using easein as a substrate. A mixture of 500 µl of 1% (w/v) of casein in 50 mM phosphate buffer at pH 7.0 and 200 µl sample was incubated in a water bath kept at 40°C for 20 min. Afterwards, 1 ml of 10% (w/v) trichloroacetic acid (TCA) was added to terminate the enzyme reaction and was kept at room temperature for 5 min. The mixture was then centrifuged at 10,000 rpm for 5 min to separate the unreacted casein. The supernatant was mixed with 2.5 ml of 0.44M Na_2CO_3 and 1 ml of 3-fold diluted FollinCiocalteu's phenol reagent. This resulting solution was incubated at room temperature in the dark for 30 min and the absorbance was measured at 660 nm.

The method adopted for other two enzymes *viz* phosphatease and urease are detailed in the supplementary data.

3. Results and discussion

3.1 X ray diffraction studies

The X-ray diffraction pattern of the sample with ZnO nanopowder prepared without adding vermiwash has peaks at 2θ = 31.8°,34.5°, 36.3°, 47.6°, 56.7°, 62.9°, 66.5°, 68.0°, 69.2°, 72.7° and 77.1°(Fig. 3) which are matched well with the standard hexagonal wurizite structure according to the JCPDS card no. 36-1451. However, when vermiwash is added, a new peak is observed at 2θ=33.2° which is related to enzymes in crystalline form [18,19]. This result confirms the presence of enzymes in the vermiwash activated nanopowder sample. The presence of enzymes in the sample, however, does not disturb the basic structure of ZnO as evidenced by the ZnO peaks in the same order. It is well known that in general, the first three high intense peaks in the powder XRD pattern of ZnO are (101), (100) and (002) [20]. The unaffected lattice constants '*a'* and '*c*', and the volume of the unit cell (Table 1) also confirm that the presence of enzymes does not affect the lattice system of ZnO [14]. It is important to mention here that the intensity of the peak related to enzymes gradually increases (Fig. 3) as the proportion of the vermiwash in the starting solution is increased, indicating the respective increase in the quantity of enzymes in the samples. The quantitative analysis of enzymes given in section 3.2 strongly supports this result.

3.2 Quantitative study of enzymes

The study of finding the quantity of enzymes present in the samples was carried out for the following three cases: (i)vermiwash collected from the vermin reactor, (ii) the prepared vermiwash activated ZnO nanopowder and (iii) the water obtained as the final product of photocatalytic treatment.

The results obtained from the quantitative study of enzymes are shown in Fig (4a and 4b).The results show that all the four enzymes *viz* amylase, phosphatase, urease and protease which are present in the vermiwash are inherited by the prepared vermiwash activated nanopowder [21, 22]. Interestingly, it is also found thatcertain portions of all the four enzymes are retained in the water obtained as the resultant product of the photocatalytic dye degradation process.

The bar diagram in Fig. 4a shows that the quantities of all the four enzymes present in the vermiwash activated ZnO nanopowder gradually increase as the volume of the vermiwash used in the starting solution is increased. The same trend is reflected in the results recorded for the quantities of enzymes present in the water obtained as the product of the photocatalytic treatment as seen in Fig. 4b. This increasing trend in the quantity of enzymes present in the vermiwash activated nanopowder is consistent with the intensities of the XRD peaks related to the enzymes (Fig.3).

3.3 Surface morphological studies

The ZnO nanopowder prepared without using vermiwash shows hexagonal grains which is one of the general characteristics of ZnO. However, the nanopowder prepared using 100 ml of vermiwash solution found to have small uniform sized spherical grains.The size of the grains increases when the volume of the vermiwash used is increased to 200 ml. When the volume of the vermiwash is increased further to 300 ml, no spherical grains are observed Fig.5(a-d). Instead, the surface seems to have grains with slightly elongated ellipsoidal grains (Fig. 5d). Among the vermiwash activated nanomaterials, the best dye degradation efficiency has been observed for the nanopowder prepared from starting solution having highest volume of vermiwash (300 ml) for which the grains size is relatively larger. This result is in contradiction with the earlier reports. Generally, according to the reports available in the literature, the smaller the grains, the higher is the dye degradation efficiency [15, 23]. This observation makes us to believe that actually the presence of enzymes plays [6, 24] a predominant role in degrading the dye molecules rather than the size of the grains does.

The EDAX result shown in Fig.5(e-h) confirms the presence of Zn and O in the system. When the volume of the vermiwashis increased, the weight percentage of Zn increases leading to an increase in oxygen vacancy.

3.4 Fourier transforms infrared (FTIR) analysis

Fig. 6 gives the FT-IR spectra of the samples prepared in the form of KBr Pellets. The IR peaks around 3300 and 2900 cm^{-1}which are appeared for the vermiwash activated ZnO nanoparticles indicate the presence of functional groups –OH and $–CH_2$. The presence of these functional groups may be due to the enzymes present in thevermiwash [25-29]. Generally, the peaks present in the regions 3400 – 3200 cm^{-1} and 1200 – 1000 $cm^{-1}$are due to – OH stretching and the O-Obending, respectively [30-37]. The peaks appear around 2900and 1400 cm^{-1} are related to the – CH_2 stretching and bending vibrations, respectively. The appearance of peak in the range 460 - 480 cm^{-1} is due to the presence of ZnO [38]. Thus, (Table.2) the presence of certain unique peaks that are observed only in the case of vermiwash activated nanomaterial samples can be considered as another supporting evidence for the presence of enzymes in the vermiwash activated nanomaterials.

3.5 Mechanism

According to the induced fit hypothesis proposed by Daniel koshland [39], the active sites of enzymes do not possess a rigid/fixed structure but have flexibility so that they can adjust themselves to fit with the shape and dimensions of the substrate. Therefore, during the synthesis, the enzymes present in the vermiwash are easily incorporated with ZnO nanoparticles resulting in the formation of enzyme-substrate complex as represented below [40, 41].

$$\text{Enzyme + Substrate} \rightarrow \text{Enzyme-Substrate complex}$$

As vermiwash activated ZnO nanoparticles are in the form of enzyme-substrate complex, their photocatalytic efficiency is greatly enhanced. We believe that formation of this enzyme-susbtrate complex may be the main reason for the drastic changes in the dimensions and shape of the grains as seen in the SEM images. During the photocatalysis treatment, when UV-vis light is incident on the ZnO nanoparticles, the electrons present in valence band (VB) move towards the conduction band (CB). These excited electrons oxidize with oxygen to generate superoxide anions whereas the holes present in VB generate hydroxyl radicals [42- 44]. As shown in Fig. 7, the reactive oxygen species cause the degradation of the dye molecules into CO_2 and H_2O as follows.

Enzyme-Substrate complex + Dye molecules →End products ($H_2O+CO_2\uparrow$) + Enzymes

When enzymes are coupled with ZnO, they stimulate the oxidation/reduction reaction of the substrate (*i.e* ZnO in the present study) and thereby cause an enhancement in the photocatalytic activity. Thus, we can understand that the addition of vermiwash causes a favourable influence on the photocatalytic dye degradation efficiency of ZnO. However, for better understanding of the synergistic mechanism between ZnO and enzymes, further studies are required.

3.6 Effect of vermiwash on the photocatalytic activity

The photocatalytic dye degrading efficiency of all the four sets of nanopowder samples $S_{0:5}$, $S_{1:4}$, $S_{2:3}$ and $S_{3:2}$ was calculated against the dye methylene blue. The efficiency of bare ZnO is only 71%. However, when ZnO is activated by the enzymes present in the vermiwash, the efficiency increases considerably as shown in Table. 3. It is seen that the efficiency increases with the increase inthe vermiwash proportion in the starting solution. Among the tested samples, the efficiency is maximum (97%) when the vermiwash proportion is maximum (300 ml). This result reveals that the increasing trend in the quantity of enzymes present in the nanopowder samples is reflected in the efficiency (Fig.8(a-f)). From these observations, we can convincingly conclude that the presence of enzymes in the ZnO nanoparticles plays a crucial role in decomposing the dye molecules photocatalytically. Moreover, as mentioned in section 3.2, the same increasing trend is observed in the quantity of enzymes present in the water obtained as the product of photocatalysis treatment of dye solution. As enzymes are useful in improving the agricultural soil, this treated water can be used for the reclamation of infertile/less fertile soils, as mentioned in the introduction section (section 1). The investigation on the influence of this treated water on seed germination and agricultural land reclamation will be taken as the subsequent study for the present one.

3.7 Chemical oxygen demand (COD) analysis

To analyse the mineralization effect caused by the enzyme activated ZnO nanomaterial in the treated dye solution, chemical oxygen demand (COD) measurements were carried out after completing the photocatalytic degradation experiments [45-47]. The COD removal percentage was calculated using the formula

$$\eta = \frac{(Initial_{COD} - Final_{COD})}{Initial_{COD}} \times 100 \qquad \text{----------- (1)}$$

where COD was calculated using the relation

$$COD = \frac{(Blank\ titrate\ value - dye\ sample\ titrate\ value) \times normality of\ FAS \times 8 \times 1000}{Volume\ of\ the\ sample} \qquad \text{------------ (2)}$$

The bar diagram (Fig.9) illustrating the COD removal efficiency is found to be 94% after 90 min of irradiation for the tested MB dye.

4. CONCLUSION

Enzyme activated ZnO nanomaterials prepared using vermiwash (a co-product of vermicompost) *via* simple soft-chemical method exhibits an enhanced photocatalytic activity due to the presence of enzymes (like amylase, phosphatase, urease and protease) inherited from the vermiwash. The resultant water obtained as the final product of photocatalytic dye degradation process is also found to possess the enzymes that present in the vermiwash. The higher the proportion of vermiwash used in the starting solution during the preparation of nanomaterials, the higher is amount of enzymes present in the nanoproduct as well as in the water obtained as the final product of photocatalysis. The results show that the photocatalytic efficiency is strongly influenced by the amount of enzymes present in the nanoproduct. The photocatalytically treated water can be used for the irrigation of agricultural lands to improve the seed germination and plant growth.

Acknowledgement

Ravichandran, the first and communicative author, gratefully acknowledges the Department of Science and Technology – Science and Engineering Research Board (DST-SERB), India, for having funded the laboratory facilities in his institution through the Major Research Project File no. EMR\2016\003326 which were instrumental for the successful completion of this work.

The authors also thank DST Government of India for the experimental facilities (SEM, FTIR, etc) established under FIST (SR/FST/College – 222/2014) in AVVM Sri Pushpam College (Autonomous), Poondi, Thanjavur.

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Figure captions

Fig.1. Vermin reactor specially designed for this study

Fig.2. Schematic diagram of a simple soft chemical process

Fig.3. XRD patterns of vermiwash activated ZnO nano powder samples

Fig.4. Quantity of enzymes presents in the (a) nanopowder samples and (b) treated water

Fig.5. SEM images and EDAX spectra of vermiwash

Fig.6. FTIR spectra of vermiwash activated ZnO nanopowder samples

Fig.7. Schematic diagram of photocatalytic dye degradation mechanism of ZnO NPs

Fig.8. (a – d) Absorbtion spectra of MB with the presence of nanopowder samples

(e) Variation in C/C_0 as a function of irradiation time

(f) Variation in In (C_0/C) as a function of irradiation time

Fig.9. Bar diagram of COD for nanopowder samples

Table captions

Table 1. Structural parameters and lattice constants of the prepared samples

Table 2. FTIR peak assignments for vermiwash activated ZnO nanopowder samples

Table 3. Photocatalytic dye degradation efficiency of the prepared samples

Figure 1

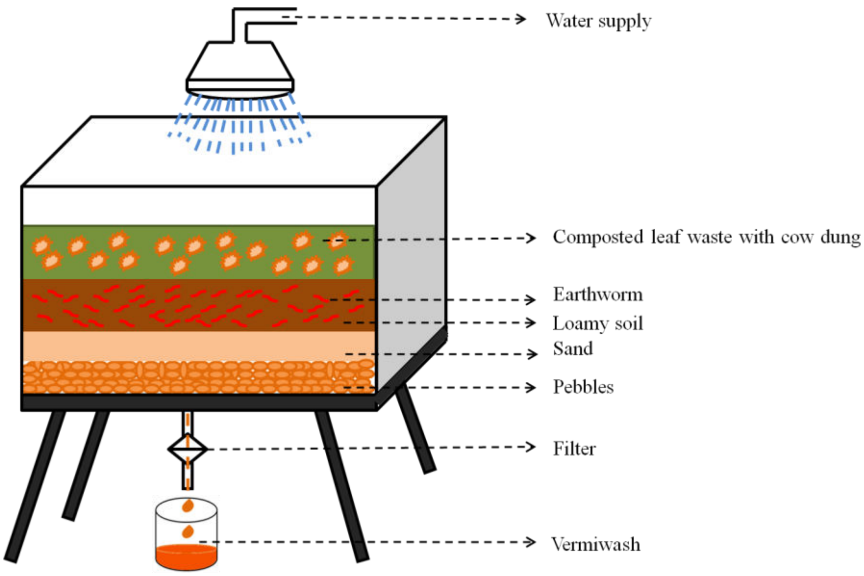

Water supply
Composted leaf waste with cow dung
Earthworm
Loamy soil
Sand
Pebbles
Filter
Vermiwash

Figure 2

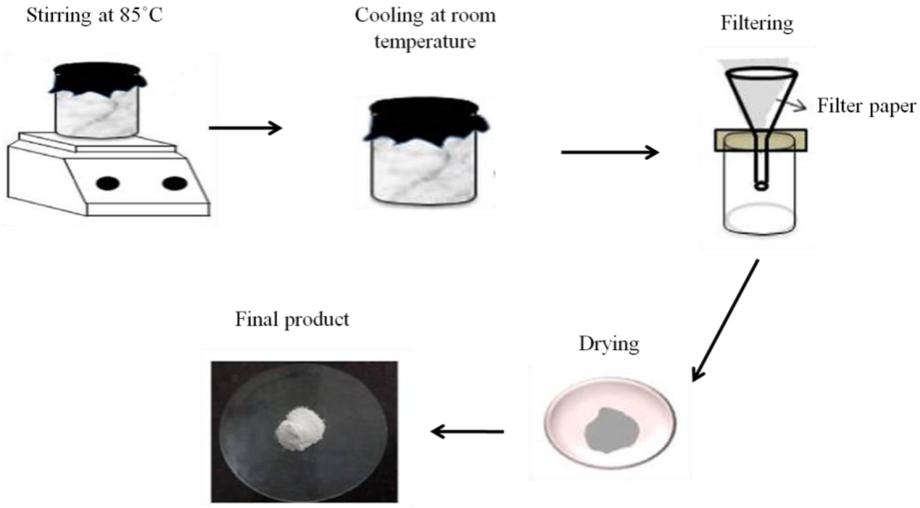
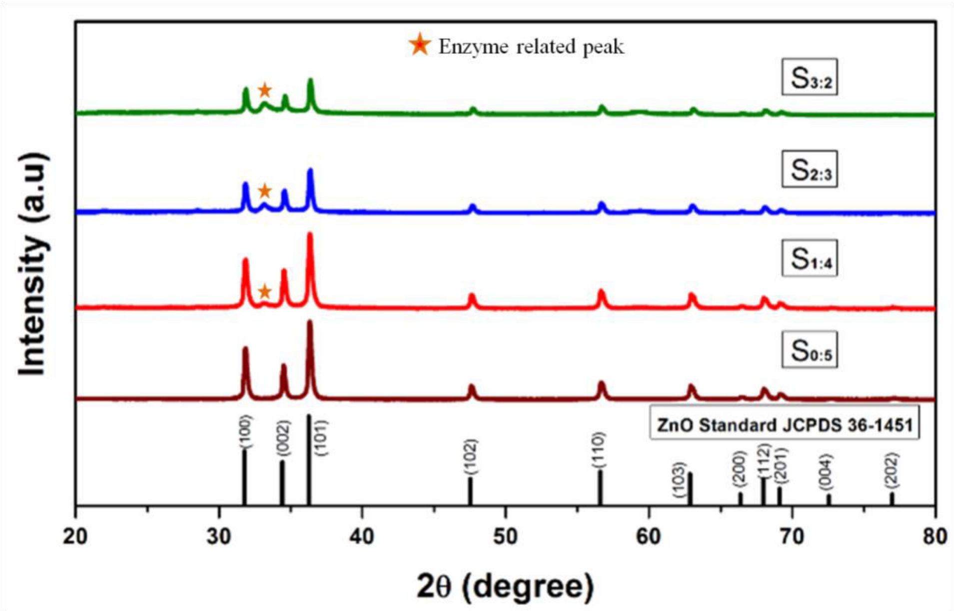

Stirring at 85°C
Cooling at room temperature
Filtering
Filter paper
Drying
Final product

Figure 3



Enzyme related peak
S3:2
S2:3
S1:4
S0:5
Intensity (a.u)
ZnO Standard JCPDS 36-1451
(100)
(002)
(101)
(102)
(110)
(103)
(200)
(112)
(201)
(004)
(202)
20
30
40
50
60
70
80
2θ (degree)

Figure 4

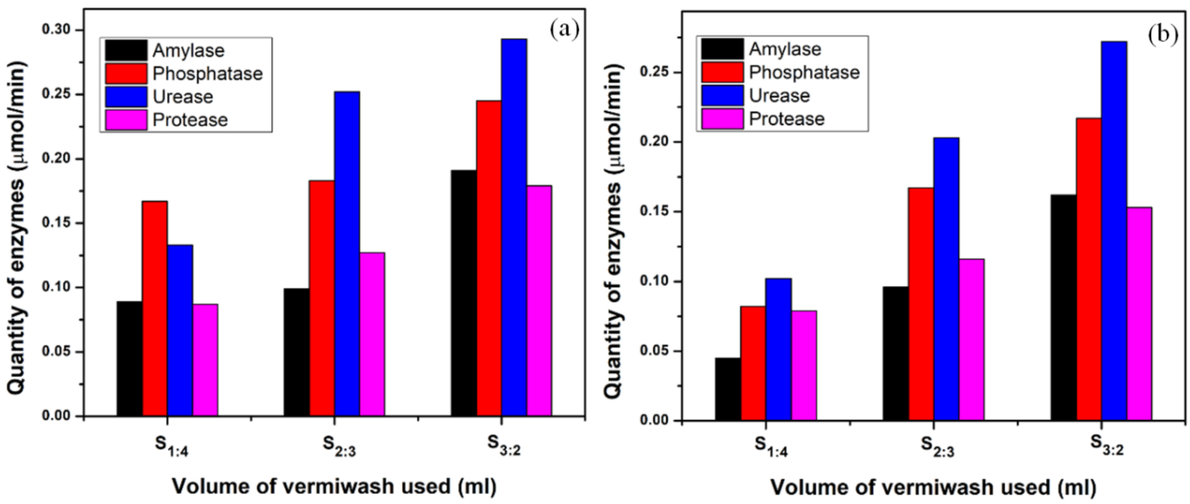

(a)
Amylase
Phosphatase
Urease
Protease
Quantity of enzymes (μmol/min)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
$S_{1:4}$
$S_{2:3}$
$S_{3:2}$
Volume of vermiwash used (ml)
(b)
Amylase
Phosphatase
Urease
Protease
Quantity of enzymes (μmol/min)
0.00
0.05
0.10
0.15
0.20
0.25
$S_{1:4}$
$S_{2:3}$
$S_{3:2}$
Volume of vermiwash used (ml)

Figure 5

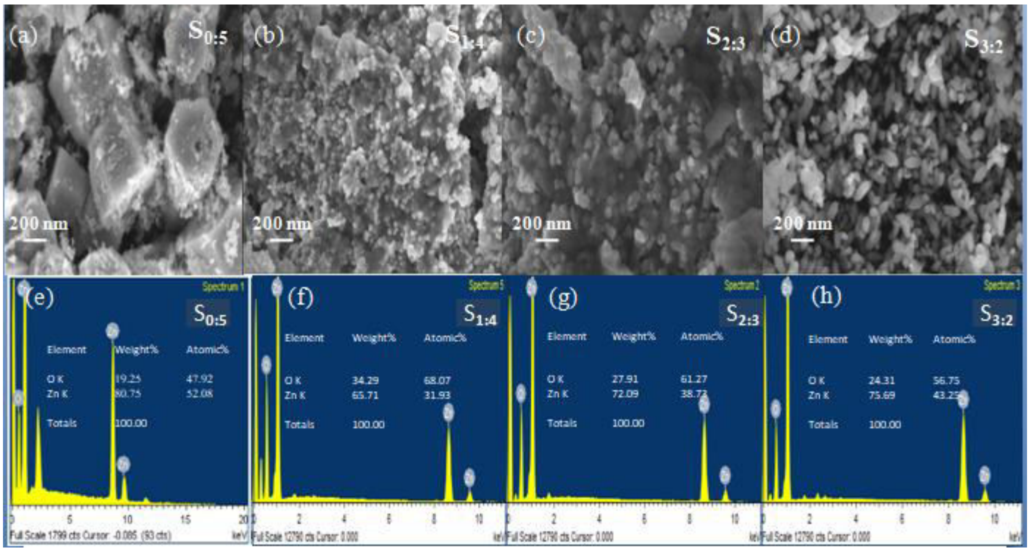
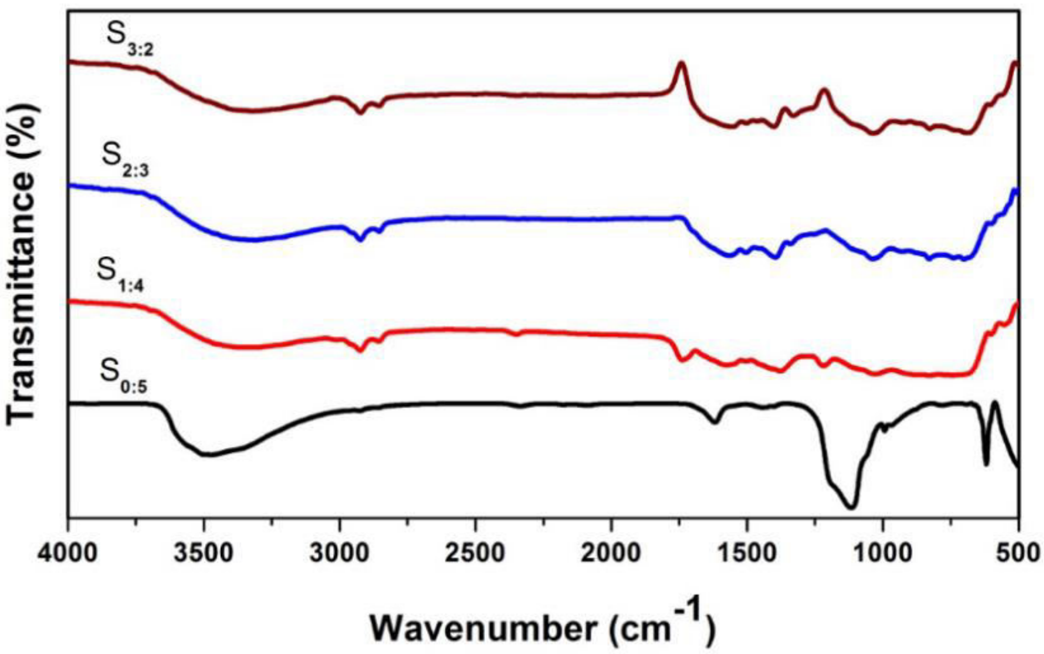
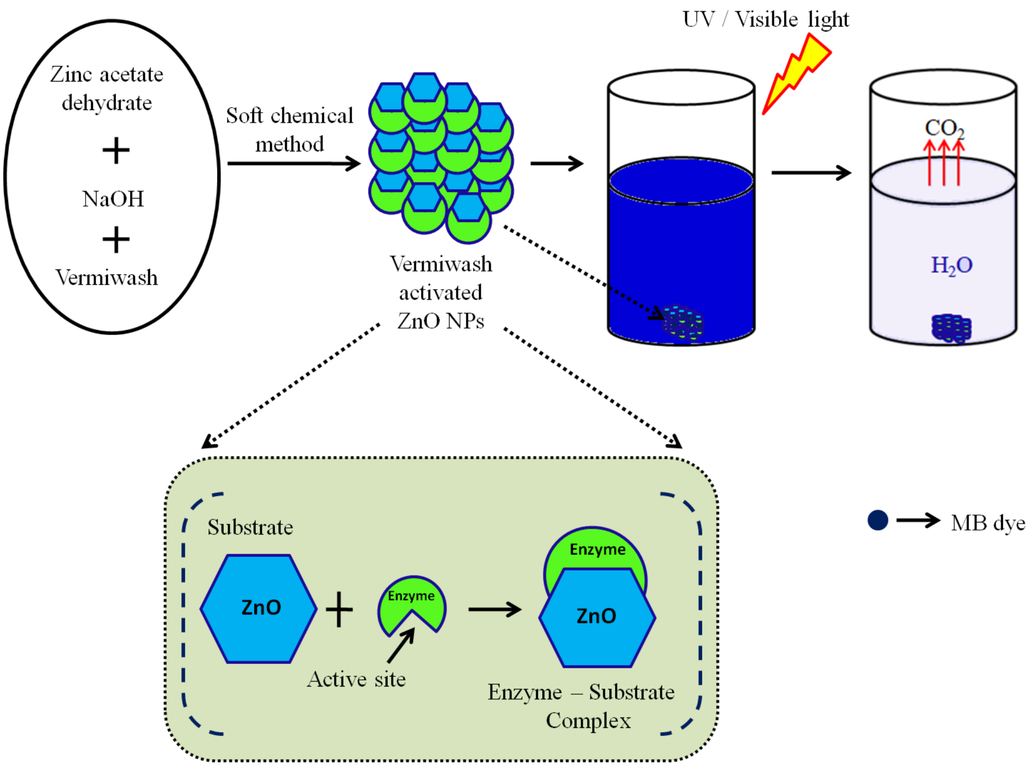

(a)
$S_{0:5}$
200 nm
(b)
$S_{1:4}$
200 nm
(c)
$S_{2:3}$
200 nm
(d)
$S_{3:2}$
200 nm
(e)
$S_{0:5}$
Element Weight% Atomic%
O K 19.25 47.92
Zn K 80.75 52.08
Totals 100.00
(f)
$S_{1:4}$
Element Weight% Atomic%
O K 34.29 68.07
Zn K 65.71 31.93
Totals 100.00
(g)
$S_{2:3}$
Element Weight% Atomic%
O K 27.91 61.27
Zn K 72.09 38.73
Totals 100.00
(h)
$S_{3:2}$
Element Weight% Atomic%
O K 24.31 56.75
Zn K 75.69 43.25
Totals 100.00
keV

Figure 6



$S_{3:2}$
$S_{2:3}$
$S_{1:4}$
$S_{0:5}$
Transmittance (%)
4000
3500
3000
2500
2000
1500
1000
500
Wavenumber (cm^{-1})

Figure 7



Zinc acetate dehydrate
+
NaOH
+
Vermiwash
Soft chemical method
Vermiwash activated ZnO NPs
UV / Visible light
CO_2
H_2O
MB dye
Substrate
ZnO
+
Enzyme
Active site
Enzyme
ZnO
Enzyme – Substrate Complex

Figure 8

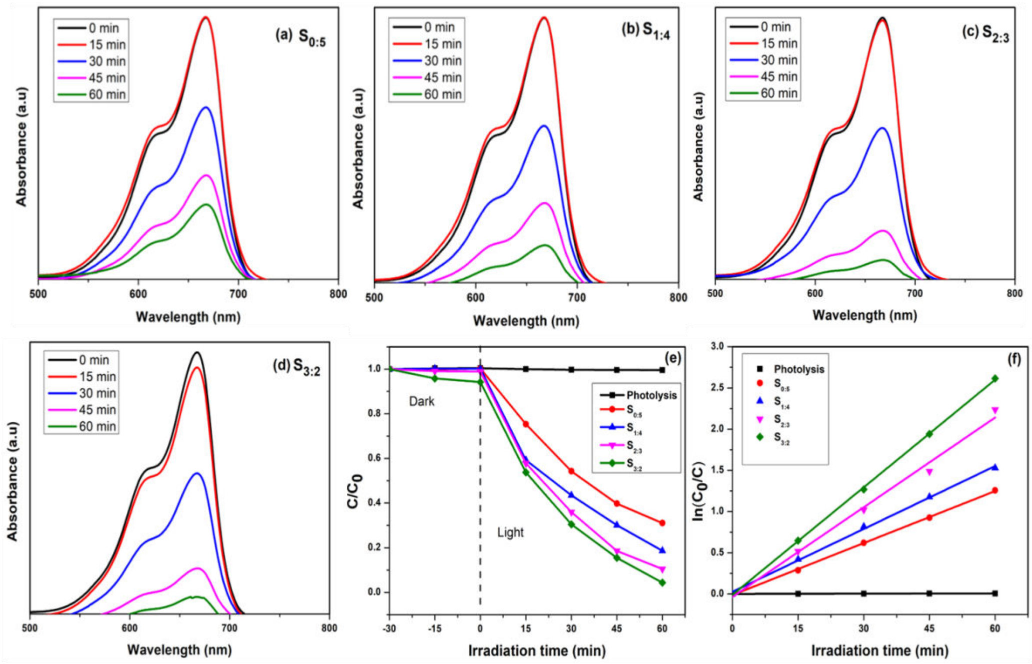
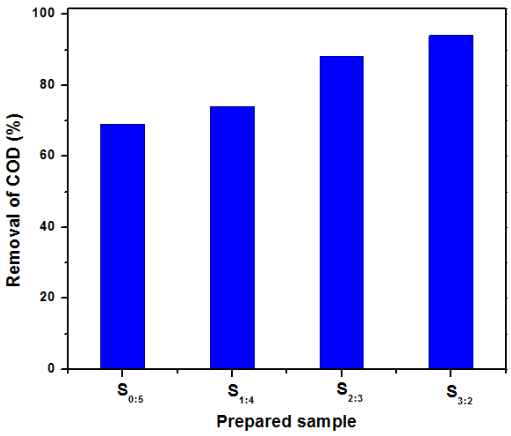

(a) $S_{0:5}$
(b) $S_{1:4}$
(c) $S_{2:3}$
(d) $S_{3:2}$
0 min
15 min
30 min
45 min
60 min
Absorbance (a.u)
Wavelength (nm)
(e)
Dark
Light
Photolysis
C/C_0
Irradiation time (min)
(f)
$\ln(C_0/C)$

Figure 9



Removal of COD (%)
100
80
60
40
20
0
$S_{0:5}$
$S_{1:4}$
$S_{2:3}$
$S_{3:2}$
Prepared sample

Table 1

Sample name	Crystallite size (nm)	Volume of the unit cell (Å)^3	c/a	Lattice constants	
				a(Å)	c(Å)
$S_{0:5}$	49.11	47.23	1.603	3.240	5.194
$S_{1:4}$	55.35	47.20	1.601	3.241	5.189
$S_{2:3}$	61.23	47.17	1.598	3.242	5.182
$S_{3:2}$	66.65	47.04	1.599	3.239	5.179

*Standard data a=3.2498Å, c=5.2066Å and c/a = 1.602 (JCDPS Card no: 36-1451)

Table 2

Wave numbers at which FTIR peaks appeared for ZnO NPs synthesized using vermiwash of different concentrations (cm^{-1})			**Peak assignments**
$S_{1:4}$	**$S_{2:3}$**	**$S_{3:2}$**	
3314	3311	3321	-OH Stretching
2924	2924	2923	$-CH_2$ Stretching
2856	2854	2855	C-H bonds
1505	1503	1502	$-CH_2$ bending
1026	1038	1039	-O-O bending
461	466	471	Zn-O

Table 3

S.No.	**Volume of vermiwash in the starting solution** (ml))	**Efficiency (%)**
1	0	71
2	100	85
3	200	92
4	300	97

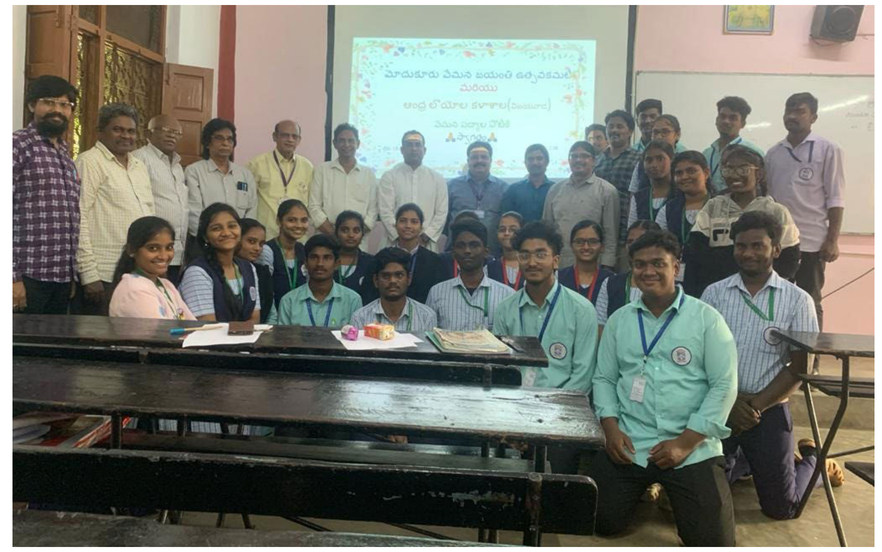
M.O U signed Between Andhra Loyola College & Vemana Jayanti Utstava Sangham of Modukuru.

VEMANA

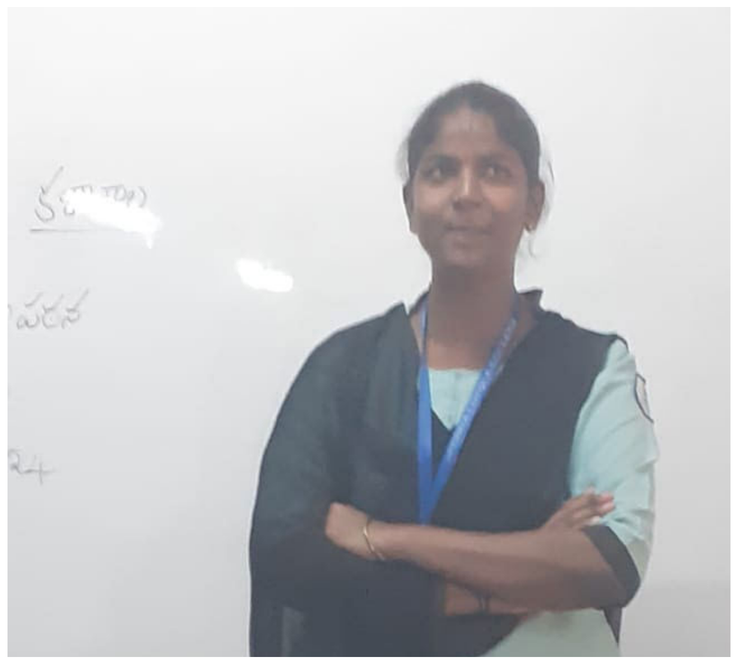
Vemana was a 17th century people's poet; He propagated through his poems in a very simple and lucid Telugu Rationalist, Humanistic values. He exposed the social evil practices and obscurantist beliefs of the then society. His views still have value and have relevance to present day Society for his poems play an important reforming role. Adhering to these rationalist, humanistic values richly imbued in Vemana"s poems, Telugu People show great reverence to his poems. Modukuru village is located at present in the Bapatla district of Andhra Pradesh. People of this village, got attracted by the values in the poems of Poet Vemana and established a Literally cultural organisation called " Vemana Sahitya Vikasa Parishat "in the year 1929,Since 1929 , Vemana Jayanti was celebrated every year on Telugu Ugadi day from 2019 onwards the Jayanti of Vemana is fixed by Govt as 19th January. Accordingly, Vemana Jayanti is observed on19th January. Respecting the interest evinced by the people of Modukuru village. The Government of ANDHRA PRADESH has sanction an amount of Rs/- 25, 00, 000 (Twenty Five lakhs of Rupees), to this Vemana Organisation, for raising a memorial in the honor of people's poet Vemana. The memorial was raised namely " Vemana Sahitya Vikasa Parishat" in the year 2021 in Modukuru village utilising the grant provided by the Government Dr. Movva Srinivasa Reddy, a teaching Faculty of Andhra Loyola college, is a native of Modukur village, he provided the needed support for all the activities of Vemana committee of Modukuru, On the request of the Vemana committee of Modukuru, We., namely , Andhra Loyola college have agreed to sign an MOU with the Vemana Committee. We signed an MOU, agreeing to help the organisation in conducting the literary and cultural activities in that village jointly hold poetic recital competitions in Andhra Loyola College. Since 2021 Andhra Loyola college staff and Students are actively involved in helping the Vemana committee of Modukuru in all the programmes organised by them.

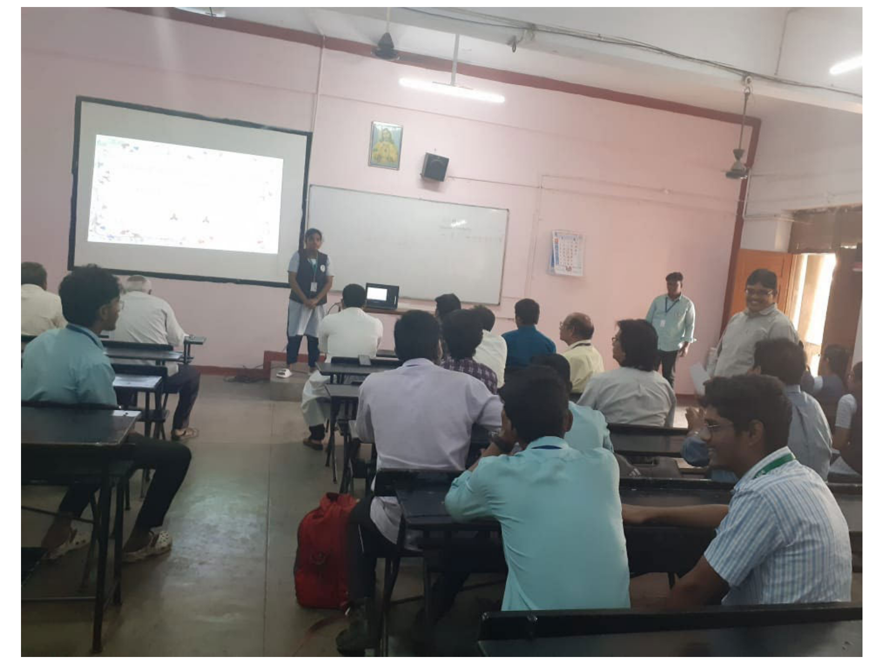
ఆంధ్రలోయోలా కళాశాల, విజయవాడలో వేమన పద్య పఠన పోటీల నిర్వహణ: మోదుకూరు వేమన జయంతి ఉత్సవ కమిటి
పాల్గొన్న విద్యార్థినీ విద్యార్థులు, ఆచార్యులు, వేమన కమిటీ అధ్యక్షులు; తేదీ: 2024-1-18

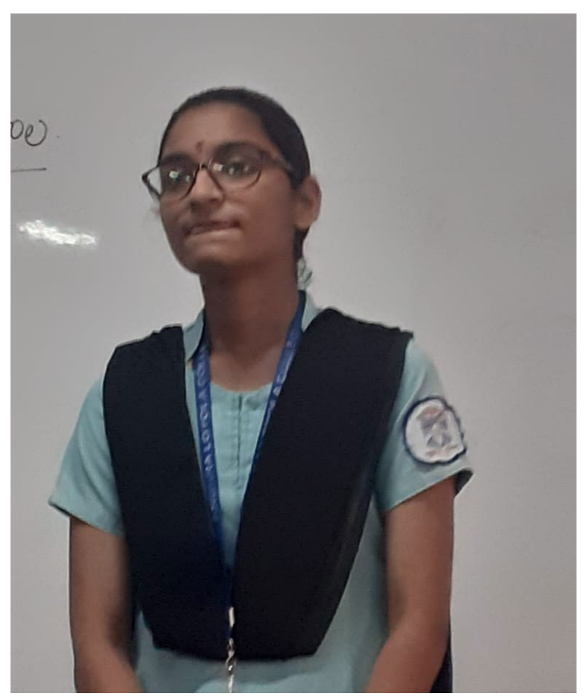
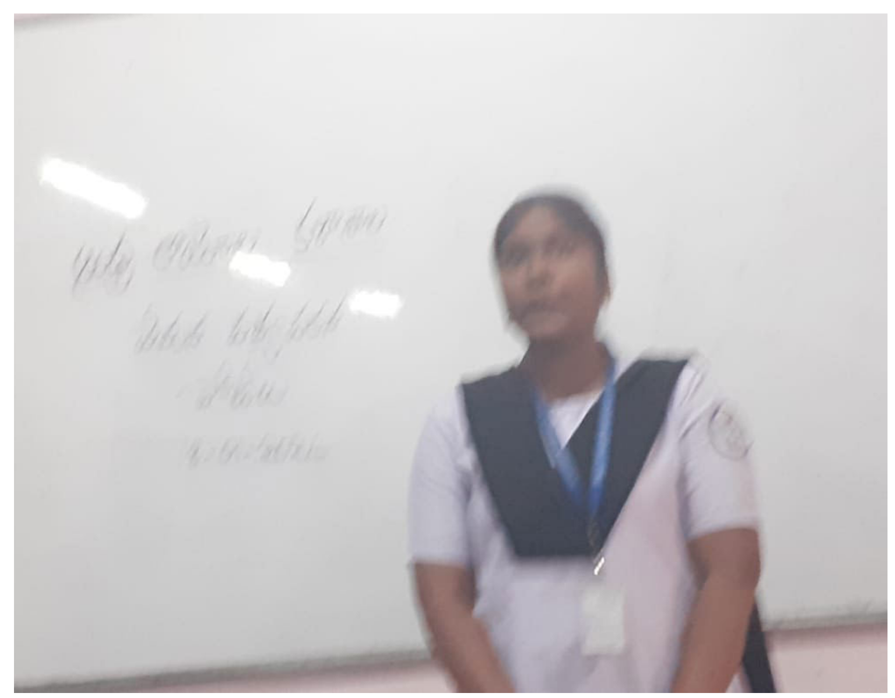











శ్రీ అన్నపరెడ్డి సుబ్బారెడ్డి, శ్రీ కానాల సుధాకర్ రెడ్డి, శ్రీ లంకపోతు రఘునాథరెడ్డి;

బహుమతి అందజేస్తున్న డా. మొవ్వ వాసవి.

ప్రసంగిస్తున్న శ్రీ యమ్. యల్. యస్, దేవకుమార్ ; ఐ.సి.డి.ఇ

బహుమతి అందజేస్తున్న శ్రీ లంకపోతు రఘునాథ రెడ్డి

స్థాపితం 1929 రిజిస్ట్రేషన్ నం.258-1987

మోదుకూరు వేమన జయంతి మహోత్సవం

19-1-2024

మోదుకూరు వేమన జయంతి ఉత్సవ కమిటీ
మరియూ ఆంధ్రలొయోలా కళాశాల,విజయవాడ
సంయుక్త నిర్వహణ

వేమన జయంతికి ఆహ్వానం

వేదిక: వేమన సాహిత్య వికాస భవనం, మోదుకూరు

ఉదయం 9గం॥లకు : చుండూరు మండల స్థాయి ప్రాథమిక మరియు ఉన్నతశాల విద్యార్థినీ విద్యార్థులకు వేమన పద్యపఠన పోటీ నిర్వహణ

మధ్యాహ్నం 3 గం॥లకు శ్రీ మహేష్ గారిచే వేమన పద్యముల గానం

సాయంత్రం 5గం॥లకు: విజయవాడ ఆంధ్ర లొయోలా కాలేజీలో మరియూ మోదుకూరులో జరిగిన వేమన పద్య పఠన పోటీ విజేతలకు బహుమతి ప్రదానం

(స్వర్గీయ సానికొమ్ము సావిత్రమ్మగారి జ్ఞాపకార్థం డా॥ మొవ్వ వాసవి రూ॥10,000-00 ప్రైజ్‌మనీ అందించారు)

శ్రీ యమ్. యల్. యస్, దేవకుమార్, ఐ.సి.డి.ఇ గారిని సన్మానిస్తున్న శ్రీ జి. అక్కిరెడ్డి

మోదుకూరు వేమన జయంతి ఉత్సవ చరిత్ర
పుస్తకాన్ని ఆవిష్కరిస్తున్న శ్రీ దేవకుమార్

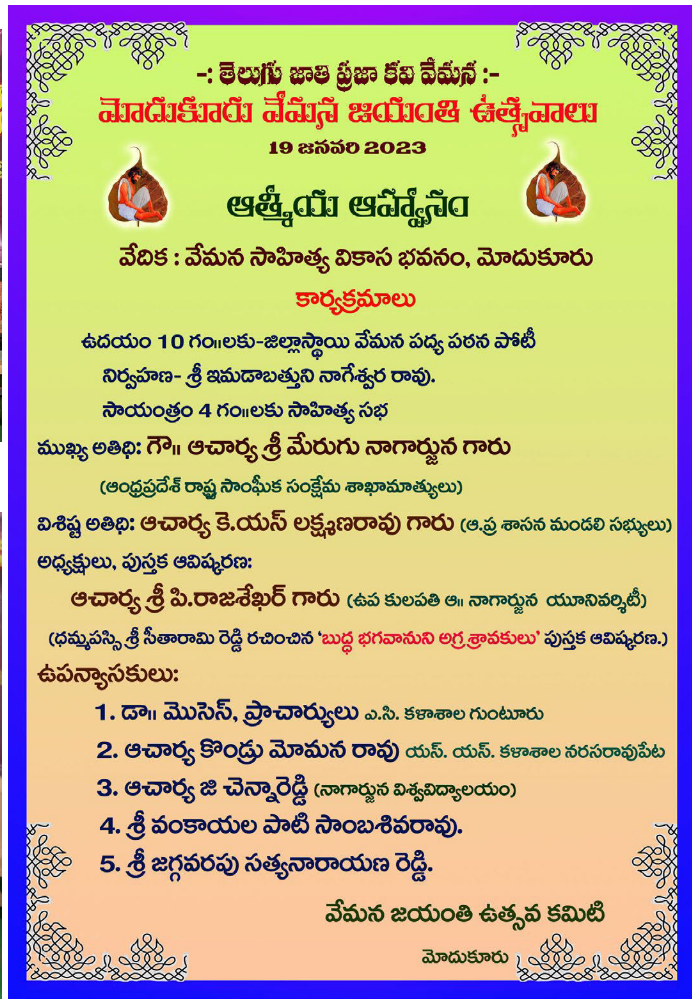
బహుమతిని అందజేస్తున్న శ్రీటి. పిచ్చిరెడ్డి, శ్రీ కానాల సుధాకర్ రెడ్డి

ఆచార్య కె.యస్. అక్ష్మణ రావు యం. యల్. సి గారికి సన్మానం

విద్యార్థులకు బహుమతులు అందజేస్తున్న డా॥ మొవ్వా శ్రీనివాసరెడ్డి

వేమన్నకు పూలమాలలు వేస్తున్నన్న డా॥మొవ్వ; డా॥పుచ్చ శ్రీనివాస శాస్త్రి

వేమన్నకు పూలమాలలు వేస్తున్నన్న శ్రీ ఎ. నరసింహారెడ్డి



-: తెలుగు జాతి ప్రజా కవి వేమన :-

మోదుకూరు వేమన జయంతి ఉత్సవాలు

19 జనవరి 2023

ఆత్మీయ ఆహ్వానం

వేదిక : వేమన సాహిత్య వికాస భవనం, మోదుకూరు

కార్యక్రమాలు

ఉదయం 10 గం॥లకు-జిల్లాస్థాయి వేమన పద్య పఠన పోటీ
నిర్వహణ- శ్రీ ఇమడాబత్తుని నాగేశ్వర రావు.
సాయంత్రం 4 గం॥లకు సాహిత్య సభ

ముఖ్య అతిథి: గౌ॥ ఆచార్య శ్రీ మేరుగు నాగార్జున గారు
(ఆంధ్రప్రదేశ్ రాష్ట్ర సాంఘీక సంక్షేమ శాఖామాత్యులు)

విశిష్ట అతిథి: ఆచార్య కె.యస్ లక్ష్మణరావు గారు (ఆ.ప్ర శాసన మండలి సభ్యులు)

అధ్యక్షులు, పుస్తక ఆవిష్కరణ:
ఆచార్య శ్రీ పి.రాజశేఖర్ గారు (ఉప కులపతి ఆ॥ నాగార్జున యూనివర్శిటీ)
(ధమ్మపస్సి శ్రీ సీతారామి రెడ్డి రచించిన 'బుద్ధ భగవానుని అగ్ర శ్రావకులు' పుస్తక ఆవిష్కరణ.)

ఉపన్యాసకులు:
1. డా॥ మొసెస్, ప్రాచార్యులు ఎ.సి. కళాశాల గుంటూరు
2. ఆచార్య కొండ్రు మోమన రావు యస్. యస్. కళాశాల నరసరావుపేట
3. ఆచార్య జి చెన్నారెడ్డి (నాగార్జున విశ్వవిద్యాలయం)
4. శ్రీ వంకాయల పాటి సాంబశివరావు.
5. శ్రీ జగ్గవరపు సత్యనారాయణ రెడ్డి.

వేమన జయంతి ఉత్సవ కమిటి
మోదుకూరు

బహుమతిని అందజేస్తున్న ఇ. పిచ్చయ్యనాయుడు

అగ్రశ్రావకులు గ్రంథాన్ని ఆవిష్కరిస్తున్నఆచార్య కె.యస్. అక్ష్మణ రావు, సభలో శ్రీ మోదుగుల పాపిరెడ్డి

విద్యార్థులకు బహుమతులు అందజేస్తున్న డా॥ మొవ్వా శ్రీనివాసరెడ్డి, డా॥పుచ్చ శ్రీనివాస శాస్త్రి

వేమన్నకు పూలమాలలు వేస్తున్నన్న గ్రామస్తులు

వేమన పద్య పఠన పోటీలో పాల్గొన్న విద్యార్థులు 2023

శ్రీటి. సీతారామి రెడ్డి గార్ని సత్కరిస్తున్న ఆచార్య కె.యస్. అక్ష్మణ రావు

డా॥మొవ్వా దంపతులకు సన్మానం,

కుమారి దివ్యశ్రీకి బహుమతిని ప్రదానం చేస్తున్న శ్రీ జి. రాధాకృష్ణా రెడ్డి

శ్రీ మోదుగుల పాపిరెడ్డిగారికి సన్మానం

వేమన పద్యాలు తెలుగుజాతి సంపద

వేమన మృతిచెంది ఏళ్లు గడిచినా తన పద్యాల ద్వారా ఇంకా సజీవంగా ఉన్నారని ఎమ్మెల్సీ కె.ఎస్. లక్ష్మణరావు అభిప్రాయపడ్డారు. చుండూరు మండలం మోదుకూరులో వేమన సాహిత్యవికాస పరిషత్తు ఆధ్వర్యంలో వేమన జయంత్యుత్సవాలను గురువారం నిర్వహించారు. ఈ సందర్భంగా ఆయన మాట్లాడుతూ వేమన పూర్వకాలంలో రాసిన పద్యాలు నేటికీ మానవ సంబంధాలు, కుటుంబ బాంధవ్యాలను తెలియజేస్తున్నాయని చెప్పారు. ఆంగ్లేయుడైన సీపీ బ్రౌన్ ప్రజాకవి వేమన రాసిన పద్యాలను తెలుగుజాతికి సంపదగా అందించారని వివరించారు. విద్యార్థులు, యువతలో మార్పు తీసుకురావడానికి తన వంతుగా వేమన 100 మంచి పద్యాలను లక్ష కాపీలు ముద్రించి పంచిపెడతానని చెప్పారు.

నైపుణ్యాభివృద్ధి కేంద్రంగా.. స్థానిక వేమన సాహిత్య వికాస పరిషత్తు భవనాన్ని గ్రంథాలయంతో పాటు నేటి యువత ఉపాధి కోసం నైపుణ్యాభివృద్ధి కేంద్రంగా వినియోగిస్తే ఈ ప్రాంతం అభివృద్ధికి దోహదపడుతుందన్నారు. ఈ విషయంలో కమిటీ సభ్యులు అవసరమైతే ప్రభుత్వ సహకారం కూడా తీసుకోవాలని సూచించారు.

అనంతరం వికాస పరిషత్తు కమిటీ అధ్యక్షుడు తియ్యగూర సీతారామిరెడ్డి ముద్రించిన గౌతమబుద్ధుని శిష్యులు సారిపుత్ర మొగ్గల్లాయనుల పుస్తకాన్ని ఆవిష్కరించారు.

పద్య పోటీల విజేత మండూరు బాలిక.. ఉమ్మడి గుంటూరు జిల్లాలో 21 పాఠశాలల నుంచి 169 మంది విద్యార్థులు వేమన పద్య పఠన పోటీల్లో పాల్గొన్నారు. వీరిలో మొదటి బహుమతి మండూరు పాఠశాలకు చెందిన విద్యార్థిని జె. రత్నశ్రీ, మోదుకూరుకు చెందిన శ్రావ్య, పొన్నూరుకు చెందిన జాహ్నవి ఆ తర్వాతి స్థానాల్లో నిలిచారు. సంగీత కళాకారిణి దివ్యశ్రీ విశిష్ట బహుమతి సాధించారు. మరో పదిమంది కన్సోలేషన్ బహుమతులు అందుకున్నారు. కార్యక్రమంలో వేమన సాహిత్య వికాసపరిషత్తు కార్యదర్శి ఎం.శ్రీనివాసరెడ్డి, సాహితీవేత్త మోదుగుల పాపిరెడ్డి, మాజీ సర్పంచి ఎం. సాంబిరెడ్డి, చుండూరు మండల పరిషత్తు ఉపాధ్యక్షుడు వెంకటరమణ రెడ్డి, నిర్వాహకులు కె.ఎల్. వాసునాయక్, ఐ. నాగేశ్వరరావు, రామ కృష్ణారెడ్డి తదితరులు పాల్గొన్నారు.

19న మోదుకూరులో వేమన జయంతి ఉత్సవాలు

తెనాలిరూరల్: బాపట్ల జిల్లా చుండూరు మండలంలోని మోదుకూరు గ్రామంలోని వేమన జయంతి ఉత్సవ కమిటీ, ఆంధ్రా లయోలా కాలేజీ విజయవాడ సంయుక్త ఆధ్వర్యంలో ఈ నెల 19న మహాకవి వేమన జయంతి ఉత్సవాలను ఘనంగా నిర్వహించనున్నారు. మోదుకూరులోని వేమన సాహిత్య భవనంలో ఆ రోజు ఉదయం గుంటూరు, బాపట్ల జిల్లాల విద్యార్థులకు వేమన పద్య పఠన పోటీలను నిర్వహిస్తారు. మధ్యాహ్నం జయంతి సభకు ఎమ్మెల్సీ కేఎస్ లక్ష్మణరావు అధ్యక్షత వహిస్తారు. రాష్ట్ర సాంఘిక సంక్షేమ శాఖ మంత్రి డాక్టర్ మేరుగ నాగార్జున, ఆచార్య నాగార్జున యూనివర్సిటీ కులపతి ఆచార్య పి.రాజశేఖర్, అధికార భాషా సంఘం రాష్ట్ర అధ్యక్షుడు పి.విజయ్‌బాబు, ప్రభుత్వ సహకార వాణిజ్య శాఖ సలహాదారు బత్తుల బ్రహ్మానందరెడ్డి, ఇతర ప్రముఖులు పాల్గొంటారని నిర్వాహకులు ఒక ప్రకటనలో తెలియజేశారు. ఇదే సభలో వేమన పద్యపఠన పోటీ విజేతలకు బహుతులను ప్రదానం చేస్తారని వివరించారు.

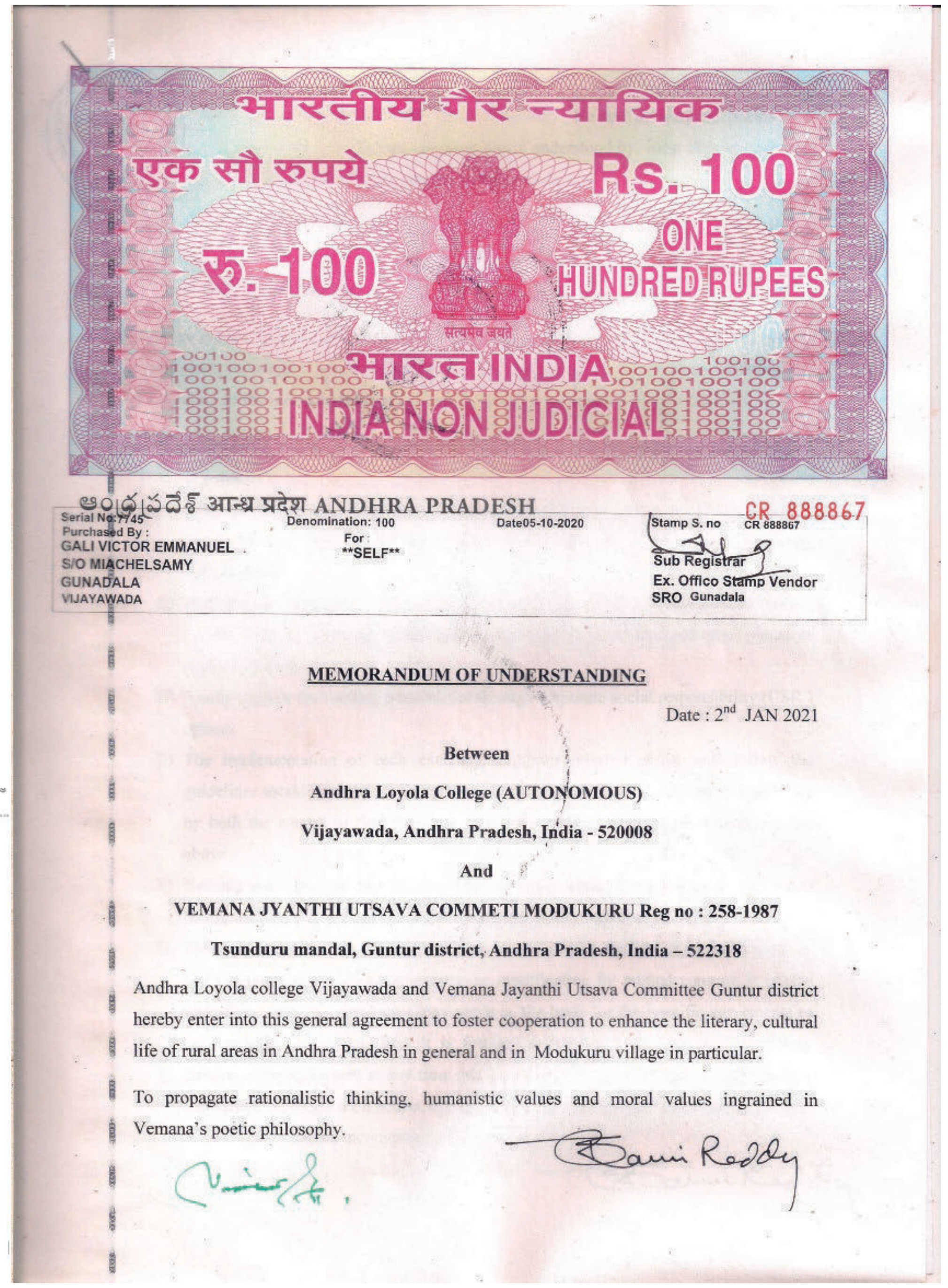
సభలో ప్రసంగిస్తున్న శ్రీ తియ్యగూర సీతారామిరెడ్డి

శ్రీ కనగాల సుబ్బారావు గారికి సన్మానం

ఆంధ్రలొయోలా కళాశాలతో యమ్. ఒ. యు ఒప్పందంలో వేమన కమిటీ

ప్రసంగిస్తున్న రె॥ఫా॥డా॥జి.ఎ. పి. కిషోర్ ప్రాచార్యులు

ధమ్మపదం పుస్తక ఆవిష్కరణ



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MEMORANDUM OF UNDERSTANDING

Date : 2nd JAN 2021

Between

Andhra Loyola College (AUTONOMOUS)

Vijayawada, Andhra Pradesh, India - 520008

And

VEMANA JYANTHI UTSAVA COMMETI MODUKURU Reg no : 258-1987

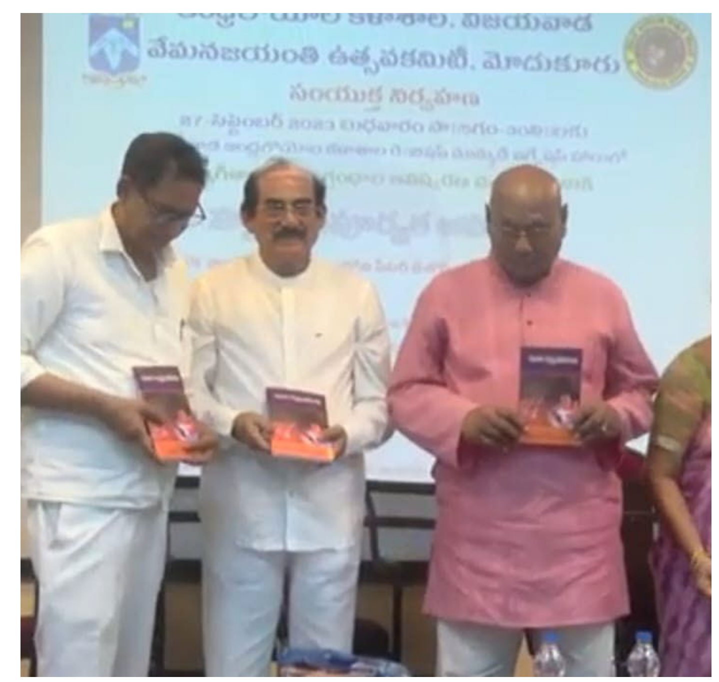
Tsunduru mandal, Guntur district, Andhra Pradesh, India – 522318

Andhra Loyola college Vijayawada and Vemana Jayanthi Utsava Committee Guntur district hereby enter into this general agreement to foster cooperation to enhance the literary, cultural life of rural areas in Andhra Pradesh in general and in Modukuru village in particular.

To propagate rationalistic thinking, humanistic values and moral values ingrained in Vemana's poetic philosophy.

ఆంధ్రలొయోలా కళాశాలలో వేమన కమిటీ కార్యక్రమంలో పాల్గొన్న శ్రీ చెన్నూరు ఆంజనేయరెడ్డి ఐ.పి.యస్, శ్రీ ఎ. యమ్.డి ఇంతియాజ్ ఐ.ఎ. యస్

ప్రసంగిస్తున్న డా.మొవ్వా: సభలో శ్రీ డి ,చంద్రశేఖర్



ధమ్మగీతాలు, మహాకాశ్యపథేరుడు పుస్తకావిష్కరణలో శ్రీ చెన్నూరు ఆంజనేయరెడ్డి ఐ.పి.యస్, శ్రీ ఎ. యమ్.డి ఇంతియాజ్ ఐ.ఎ. యస్, డా॥యం. సి. దాస్, శ్రీమతి భారతి, శ్రీ గోళ్ల నారాయణరావు; డా. రవిచంద్రారెడ్డి శ్రీటి. సీతారామి రెడ్డి

స్థాపితం 1929 రిజిస్ట్రేషన్ నం.258-1987

మోదుకూరు వేమన జయంతి మహోత్సవం

19-1-2024

మోదుకూరు వేమన జయంతి ఉత్సవ కమిటీ
మరియూ ఆంధ్రలొయోలా కళాశాల,విజయవాడ
సంయుక్త నిర్వహణ

వేమన జయంతికి ఆహ్వానం

వేదిక: వేమన సాహిత్య వికాస భవనం, మోదుకూరు

ఉదయం 9గం॥లకు : చుండూరు మండల స్థాయి ప్రాథమిక మరియు ఉన్నతశాల విద్యార్థినీ విద్యార్థులకు వేమన పద్యపఠన పోటీ నిర్వహణ

మధ్యాహ్నం 3 గం॥లకు శ్రీ మహేష్ గారిచే వేమన పద్యముల గానం

సాయంత్రం 5గం॥లకు: విజయవాడ ఆంధ్ర లొయోలా కాలేజీలో మరియూ మోదుకూరులో జరిగిన వేమన పద్య పఠన పోటీ విజేతలకు బహుమతి ప్రదానం

PRINCIPAL
ANDHRA LOYOLA COLLEGE
VIJAYAWADA-8