3.2.1 Institution has created an ecosystem for innovations and has initiatives for creation and transfer of knowledge.

Supporting Documents

INDEX

लोकनेते डॉ. बाळासाहेब विखे पाटील
(पद्मभूषण उपाधिने सन्मानित)
प्रवरा
ग्रामीण शिक्षण
संस्था
प्रवरानगर

जा.नं.पीआरईएस/२०१६-१७/३३४६

दिनांक: ०५/०१/२०१७

प्रति,
मा.प्राचार्य / प्राचार्या,
सर्व तांत्रिक व अतांत्रिक महाविद्यालये,
लोकनेते डॉ.बाळासाहेब विखे पाटील (पद्मभूषण उपाधिने सन्मानित)
प्रवरा ग्रामीण शिक्षण संस्था, प्रवरानगर

कला,विज्ञान व वाणिज्य महाविद्यालय
कोल्हार,ता.राहाता,जि.अहमदनगर.
पत्र आवक क्र.: 6877
पत्र आवक दि.: 06.01.2017

विषय : Dr. APJ अब्दुल कलाम संशोधन केंद्र संलग्नीकरणा बाबत.

महोदय,

ग्रामीण भागातील विद्यार्थ्यांचा वैज्ञानिक दृष्टीकोन वृध्दींगत करण्यासाठी आणि त्यांच्या नाविन्यपूर्ण कल्पनांना प्रोत्साहन देण्यासाठी राजीव गांधी विज्ञान व तंत्रज्ञान आयोग, भारत सरकारच्या प्रस्तावानुसार लोकनेते डॉ.बाळासाहेब विखे पाटील (पद्मभूषण उपाधिने सन्मानित) प्रवरा ग्रामीण शिक्षण संस्थेच्या पद्मश्री विखे पाटील कला, विज्ञान व वाणिज्य महाविद्यालय, प्रवरानगर या महाविद्यालयाच्या कॅम्पसमध्ये **डॉ. ए. पी. जे. अब्दुल कलाम विज्ञान केंद्र** दिनांक **१३ डिसेंबर, २०१६** पासून सुरु करण्यात आले आहे.

डॉ. ए. पी. जे. अब्दुल कलाम विज्ञान केंद्र अंतर्गत लोकनेते डॉ.बाळासाहेब विखे पाटील (पद्मभूषण उपाधिने सन्मानित) प्रवरा ग्रामीण शिक्षण संस्थेची सर्व तांत्रिक व अतांत्रिक महाविद्यालये संलग्नीत आहेत. आपण आपल्या महाविद्यालयातील प्राध्यापक व विद्यार्थ्यांना डॉ. ए. पी. जे. अब्दुल कलाम विज्ञान केंद्राबाबत माहिती देवून या संशोधन केंद्राचा लाभ घेण्यासाठी प्रोत्साहित करावे.

कळावे,

5/1/2017
संचालक शिक्षण
तांत्रिक व अतांत्रिक विभाग

प्रत माहितीसाठी -

१. **मा.सह सचिव**
लोकनेते डॉ.बाळासाहेब विखे पाटील (पद्मभूषण उपाधिने सन्मानित)
प्रवरा ग्रामीण शिक्षण संस्था, प्रवरानगर

२. **मा.संचालक**
डॉ.ए.पी.जे. अब्दुल कलाम विज्ञान केंद्र,
व्दारा, पद्मश्री विखे पाटील कला, विज्ञान व वाणिज्य महाविद्यालय, प्रवरानगर
ता.राहाता, जि.अहमदनगर.

DIC – MHRD PROJECT

MEMORANDUM OF UNDERSTANDING

BETWEEN

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

DESIGN INNOVATION CENTER

AND

PRAVARA

PRAVARA RURAL EDUCATION SOCIETY, PRAVARANAGAR

TAL: RAHATA, DIST: AHMEDNAGAR.

PRAVARA RURAL EDUCATION SOCIETY

(Estd. 1964)

Creating Noble Minds

REF:PRES/2017-18/ HD-5277 DATE: 27.3.2018

To,

The Registrar,
Savitribai Phule Pune University,
Ganeshkhind, Pune,
Maharashtra 411007.

Subject: Regarding submission of the MoU and related documents.

Respected Sir,

With reference to the above mentioned subject, herewith submitting the Memorandum of Understanding, Annexure I and Annexure II. The same is being submitted as a procedure for applying under the Design Innovation Center.

We request you to accept the proposal.

Thanking you.

Yours sincerely,

(Dr. S. B. Nimse)
Director General, PRES, Pravaranagar

Pravara Rural Education Society's

Padmashri Vikhe Patil College of Arts, Science & Commerce, Pravaranagar

A/P. LONI 413713, TAL. RAHATA, DIST. AHMEDNAGAR
E-mail : pvpcollege@gmail.com Web - www.pravarapvpcollege.org.in
Offi. (02422) 273425 Fax No. : (02422) 273426
Affiliated to University of Pune ID No. PU/AN/ASC/016(1971)

Padmashri Dr.Vitthalrao Vikhe Patil
1901-1980

Re-Accredited by NAAC at 'A' Grade with CGPA 3.61 out of 4
Recipient of Best Rural College Award & 'College of Excellence' Status by UGC,New Delh

Dr. P. M. Dighe, M.Sc.Ph.D.(Physics)
Principal

REF:PVPC/2017-18/ HD·1170 DATE: 27.3.2018

To,

The Registrar,
Savitribai Phule Pune University,
Ganeshkhind, Pune,
Maharashtra 411007.

Subject: Regarding submission of the MoU and related documents

Respected Sir,

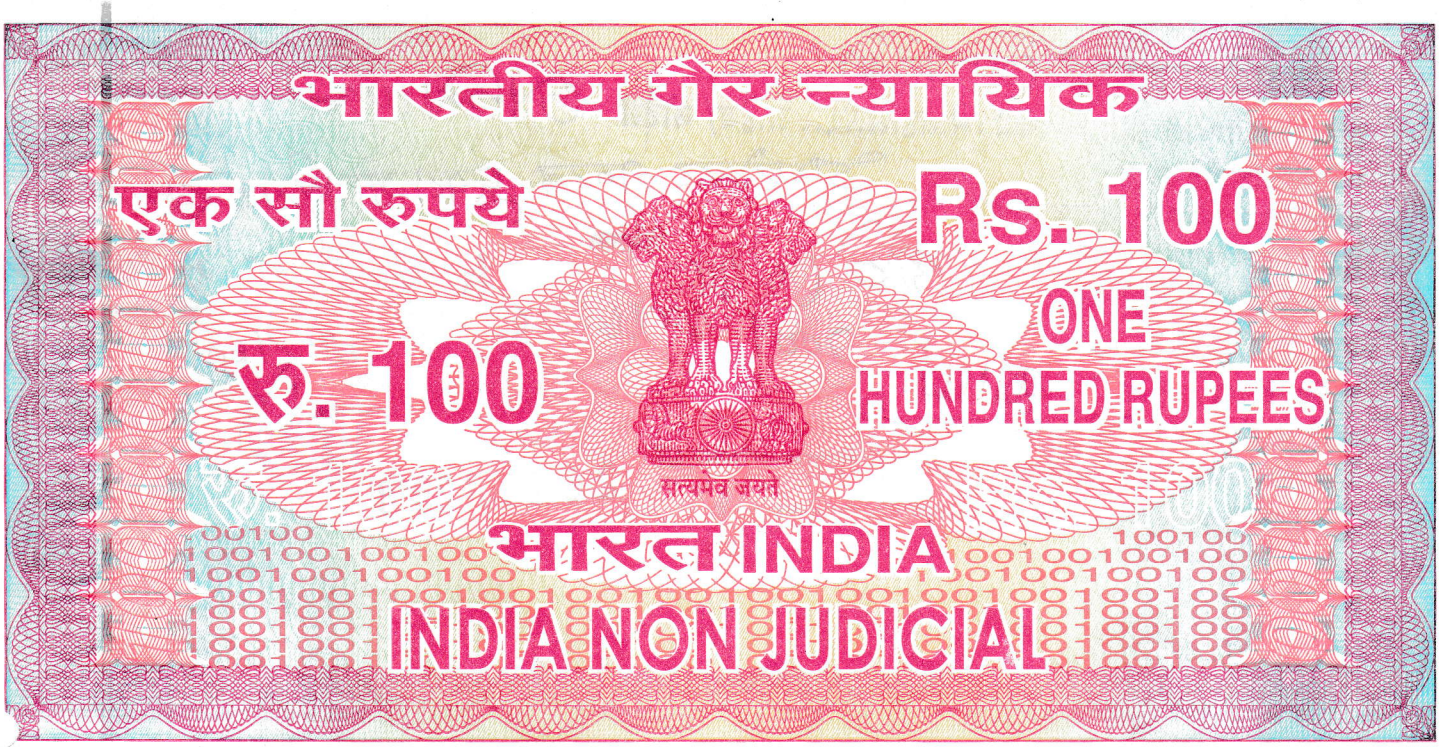
With reference to the above mentioned subject, herewith submitting the Memorandum of Understanding, Annexure I and Annexure II. The same is being submitted as a procedure for applying under the Design Innovation Center.

We request you to accept the proposal.

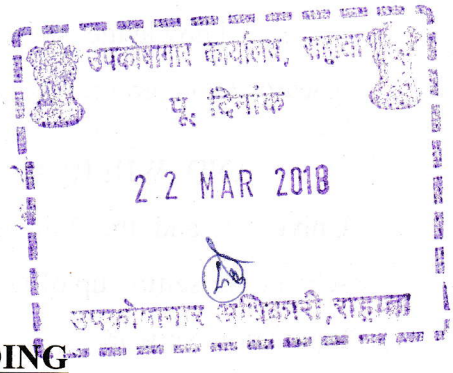
Thanking you.

Yours sincerely,

(Dr. P. M. Dighe)
PRINCIPAL
PADMASHRI VIKHE PATIL COLLEGE,
PRAVARANAGAR, A/P. LONI, TAL. RAHATA



महाराष्ट्र MAHARASHTRA © 2017 © SX 174204



MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is made at Pune on this 27th day of March, 2018.

BETWEEN

Savitribai Phule Pune University, Ganeshkhind, Pune 411007, a body corporate governed by the Maharashtra Universities Act, 1994 (Maharashtra Act No. XXXV of 1994), (hereinafter referred to as the University) through the Registrar, of the One Part;

AND

Pravara Rural Education Society, situated at Pravaranagar, Dist-Ahmednagar, registered as a Public Charitable Trust under the Bombay Public Trusts Act, 1950 and the Societies Registration Act, 1860 (hereinafter referred to as PRES) through the Co-ordinator, of the other part;

WHEREAS it has been a concern of the Government of India to establish Design Innovation Centre to promote a culture of innovation and creative problem solving, to promote knowledge sharing and to enhance interdisciplinary design-focused education, research and entrepreneurial activities;

AND WHEREAS a Memorandum of Understanding is executed between the University and the Ministry or Human Resource Development for implementation of a scheme for setting up of Design Innovation Centre, Open Design School and National Design Innovation Network;

AND WHEREAS in order to achieve the objectives of the said Scheme as mentioned in the Guidelines for setting up of Design Innovation Centre, Open Design School and National Design Innovation Network, the University desires to establish a Design Innovation Centre (DIC), which will function through main Hub Centre at the University Campus and three Spoke Centres;

AND WHEREAS PRES is engaged in developing appropriate technologies for rural, areas and training rural areas youth to start their enterprises;

AND WHEREAS the University and PRES desire to establish a Spoke Centre for DIC at the campus of PRES at Pravaranagar (hereinafter referred to as the Project) and to enter into a Memorandum of Understanding for that purpose.

NOW IT IS AGREED BY AND BETWEEN THE PARTIES AS UNDER:

1. **Role and Responsibilities of PRES**

PRES shall;

i) Establish a Spoke Centre of DIC at its P.V.P. College, Pravaranagar Campus;

ii) Appoint a Centre co-ordinator who will be leader in the profession and eminent person in the field;

iii) Conduct the following courses approved by the University Authorities at the Spoke Centre of DIC at Pravaranagar, details of which are mentioned in Annexure I of this MoU, which shall form an integral part of this MoU:

a) Repair & Maintenance of electrical domestic appliances.

b) Entrepreneurship development in Agriculture

c) Basics of mechano car and robotics.

d) Protyping and 3D printing.

e) Designing & implementation of sensor technology for drip irrigation/Polyhouse.

f) LaTeX Software Applications for the undergraduate students.

g) Applications of the software and information technology in Research Methodology.

h) Innovative approaches to drug design

i) Advanced and innovative techniques for environment and watershed management

j) Advanced techniques for improvement of plant growth and health using soil microorganisms

k) Design and development of signal conditioning and sensor technology

l) Chromatographic techniques for designing forensic and industrial

iv) Issue advertisements for admission to the course after seeking prior approval of the Pro-vice Chancellor.

v) Process admission to the courses; admit eligible students to the courses and collect course fee

from the students as per the fee structure approved by the University;

Design Innovation Centre * Savitribai Phule Pune University *

vi) Conduct examinations of the courses and declare their results;

vii) Appoint teachers, instructors and other staff members required for conducting the courses;

viii) Provide necessary infrastructure to conduct the courses;

ix) Achieve targets given in the Detailed Project Report (DPR)/ supplementaries to DPR/ Presentations made before PAB, mentioned in Annexure II of this MoU, which shall form an Integral part of this MoU;

x) Comply with the terms and conditions for the release of the first and subsequent grants by the

University as described in Clause 3(i) to (iv);

xi) Submit to the University all reports and documents relating to progress of the Project, accounts, audit, procurement, disbursement and Annual Work Plan, within ten days from the end of each year or at such frequency as may be required by the University;

xii) Maintain a separate Account and record of the Project grant received from the University and render Annual Accounts and Utilization Certificates;

xiii) Furnish to the University quarterly Financial Monitoring Report (FMRs) in the prescribed format in accordance with the procedure;

xiv) Meet all necessary and incidental expenses for the performance of responsibilities like expense for meetings, travel, professional fees, and cost of pre-project activities which will not be the liability of the University.

2. <u>Role and Responsibilities of the University:</u>

The University shall

i) Approve and prescribe the syllabus and the fee structure for the courses to be conducted by PRES;

ii) Release the grant to PRES As described in Clause 3(i) to (iv);

iii) Arrange to render such technical assistance and guidance as may be needed by PRES, from time for an effective and efficient implementation of the Project;

iv) Supervise the activities carried out by PRES under the Project;

v) Take corrective action against PRES, if it fails to perform the obligations under this Mou and the Project;

vi) Review the findings of audits and maintain policy reforms and conduct evaluation studies;

vii) Monitor the quality of courses and examinations;

viii) Issue certificates to the successful candidates after completion of the course;

Design Innovation Centre * Savitribai Phule Pune University *

ix) Monitor adherence to the implementation of the MoU by PRES, annually.

3. Payment Terms:

i) The University will release the grants under the Project to PRES, in the following

Salary of DIC Coordinator (Rs. 25,000/- p.m. One Person) for Project duration	At actual till Completion of the Project. (Two Year Duration) Rs. 6,00,000/-
Establishment of Spoke Centre of DIC and conducting Projects -	
Production of unconventional feedstuffs from the agriculture and urban organic waste and its scale-up with lignin degrading enzymes for utilization as a livestock diet.	Rs. 810985/-
Isolation, characterization, standardization and formulation of indigenous Lactic Acid Bacterial culture for Silage production.	Rs. 810985/-
Designing of Self-Propelled Onion Harvester	Rs. 608239/-
Development of android application for detection of age-wise health related disorders.	Rs. 608239/-
Designing of Helmet assisted two wheeler ignition system	Rs. 486591/-
Extraction of ecofriendly colours from horticultural produce	Rs. 608239/-
Mobile controlled door closure system	Rs. 61229/-
R. F. Tag for students attendance	Rs. 202746/-
Face / Voice Recognition sensors in door to prevent robbery	Rs. 202747/-
Total	**Rs. 50,00,000/- (Rupees Fifty Lakh) + Including Salary of the DIC Coordinator**

ii) The University will release 30% amount of the grants for the Project to PRES as advance. Remaining grants will be released in installments as may be decided by the University, on the basis of progress and performance of the activities under this MoU and the Project.

iii) Disbursement of grants to PRES will be based on expenditure made and unspent balance lying with PRES.

iv) Payments will be made by the University in the name of Co-ordinator, Spoke Centre of

Design Innovation Centre * Savitribai Phule Pune University *

DIC, PRES, Pravaranagar. For DIC Project of PRES.

v) PRES Agrees to provide a share of 20% of the fees collected from the students to the University within 30 days from the last date of admission to the course.

4. Effective Date and Duration of the MoU:

This MoU shall be effective from the date it is signed by the parties hereto and will continue to be effective up to the closure of the Scheme.

5. Amendment to the MoU:

No amendment to this MoU shall be valid unless the same is made in writing by the parties Hereto or their authorized representatives and specifically stating the same to be an amendment to this MoU.

6. Settlement of Disputes:

Any dispute between the Parties shall be resolved by mutual consultation without any resort to

Arbitration and other form of legal remedy including resort to Court of Law.

7. General:

i) The Spoke Centre of DIC established by PRES at Pravaranagar will work with full functional,

financial and administrative autonomy within the framework of PRES.

ii) By this MoU, both Parties affirm their commitment to carry out the activities and achieve the objectives mutually agreed upon.

IN WITNESS WHEREOF both the parties hereto have here unto set and subscribed their hands

and seals, the date and year hereinabove mentioned.

Design Innovation Centre * Savitribai Phule Pune University *

For and on behalf of Savitribai Phule Pune University

Registrar
Savitribai Phule Pune University, Pune

For and on behalf of Pravara Rural Education Society, Pravaranagar

Dr. S. B. Nimse
Director General, PRES, Pravaranagar

Witnesses:

1. **Dr. Pooja Doshi**
   Co- cordinator, Design Innovation Centre
   Savitribai Phule Pune University

Witnesses:

1. **Dr. Pradeep M. Dighe**
   Principal, P.V.P College, Pravaranagar
   PRINCIPAL
   PADMASHRI VIKHE PATIL COLLEGE,
   PRAVARANAGAR, A/P. LONI, TAL. RAHATA

2. **Prof. Autade R. H.**
   Co-ordinator, Spoke center of DIC
   PRES, Pravaranagar

3. **Dr. N. D. Sali**
   Associate Professor, Department of Electronic Science, P.V.P College, Pravaranagar

ANNEXURE I

Details of the Courses

a) **Repair & Maintenance of electrical domestic appliances. (6 Months)**
   Eligibility Criteria for Admission: 10th Pass
   Fee Structure: Rs. 5,974/-

b) **Entrepreneurship development in Agriculture (6 Months)**
   Eligibility Criteria for Admission: 10+2 / Agricultural Polytechnic (3 Year) / Agril. Diploma (2 Year) / Dairy Diploma (2 Year)
   Fee Structure: Rs. 5,974/-

Design Innovation Centre * Savitribai Phule Pune University *

c) **Basics of Mechano car and robotics. (6 Months)**

Eligibility Criteria for Admission: Age - 12-40; School & College students and persons with aptitude

Fee Structure: Rs. 5,974/-

d) **Protyping and 3D printing. (6 Months)**

Eligibility Criteria for Admission: Age - 12-40; School & College students and persons with aptitude

Fee Structure: Rs. 5,974/-

e) **Designing & implementation of sensor technology for drip irrigation/Polyhouse. (6 Months)**

Eligibility Criteria for Admission: 12th Pass

Fee Structure: Rs. 5,974/-

f) **LaTeX Software Applications for the undergraduate students.**

Eligibility Criteria for Admission: 3rd Year UG student of any branch

Fee Structure: Rs. 5,974/-

g) **Applications of the software and information technology in Research Methodology. (6 Months)**

Eligibility Criteria for Admission: 2nd Year UG student of any branch

Fee Structure: Rs. 5,974/-

h) **Innovative approaches to drug design**

Eligibility Criteria for Admission: Bachelor's degree in Chemical and Life Sciences, or B.Pharm.

Fee Structure: Rs. 5,974/-

i) **Advanced and innovative techniques for environment and watershed management**

Eligibility Criteria for Admission: Bachelor's degree in any Science Stream

Fee Structure: Rs. 5,974/-

j) **Advanced techniques for improvement of plant growth and health using soil microorganisms**

Eligibility Criteria for Admission: Bachelor's degree in any Science Stream

Fee Structure: Rs. 5,974/-

k) **Design and development of signal conditioning and sensor technology**

Design Innovation Centre * Savitribai Phule Pune University *

Eligibility Criteria for Admission: Masters degree in Physics, Electronics, Instrumentation

Fee Structure: Rs. 5,974/-

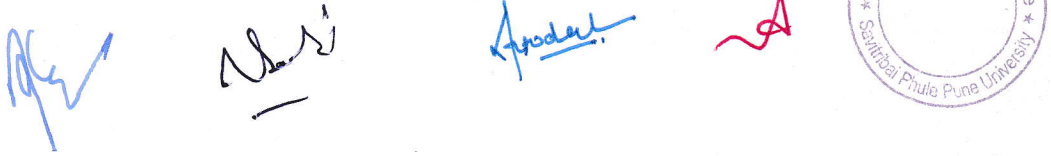
l) **Chromatographic techniques for designing forensic and industrial**

Eligibility Criteria for Admission: Bachelor's degree in any Science Stream

Fee Structure: Rs. 5,974/-

Course Structure

All courses are of 30 credits and are approved as Level 5 courses under National Skills Qualifications Framework (NSQF).



For and on behalf of Savitribai Phule Pune University

Registrar
Savitribai Phule Pune University, Pune

For and on behalf of Pravara Rural Education Society, Pravaranagar

Dr. S. B. Nimse
Director General, PRES, Pravaranagar

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   Principal, P.V.P College, Pravaranagar

PRINCIPAL
PADMASHRI VIKHE PATIL COLLEGE,
PRAVARANAGAR, A/P. LONI, TAL. RAHATA

Design Innovation Centre
Savitribai Phule Pune University

ANNEXURE II

Detailed Project Report (DPR) / Supplementaries to DPR/ Presentations made before PAB

.....

.....

For and on behalf of Savitribai Phule Pune University

Registrar

Savitribai Phule Pune University, Pune

For and on behalf of Pravara Rural Education Society, Pravaranagar

Dr. S. B. Nimse

Director General, PRES, Pravaranagar

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Savitribai Phule Pune University

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PRINCIPAL
PADMASHRI VIKHE PATIL COLLEGE,
PRAVARANAGAR, A/P. LONI, TAL. RAHATA

Design Innovation Centre
Savitribai Phule Pune University

Loknete Dr.Balasaheb Vikhe Patil (Padma Bhushan Awardee)

Pravara Rural Education Society

ARTS, SCIENCE & COMMERCE COLLEGE, KOLHAR

Tal. Rahata, Dist. Ahmednagar- 413 710

(Affiliated to Savitribai Phule Pune University, Pune)

A REPORT ON

A Visit to Dr. A. P. J. Abdul Kalam Science Centre, Loni

Organized by,

Startup and Innovation Cell,

ARTS, SCIENCE & COMMERCE COLLEGE, KOLHAR

Date: (11th Oct., 2021), Time: 10.00 A. M.

LOKNETE DR. BALASAHEB VIKHE PATIL
(PADMA BHUSHAN AWARDEE)
PRAVARA RURAL EDUCATION SOCIETY
ARTS, SCIENCE & COMMERCE COLLEGE
KOLHAR
Tal. Rahata, Dist. Ahmednagar, Pin - 413 710
NAAC Accredited at 'A' Grade with CGPA 3.10

A REPORT ON

A Visit to Dr. A. P. J. Abdul Kalam Science Centre, Loni

Introduction:

Institution has formulated "Start-up and Innovation Cell" in order to develop science temper within the students. Through this cell institution organises several activities such as Science exhibition, Poster presentation, Quiz competition, Training programmes, visit to learning centres etc. In the academic year 2021-22 "Start-up and Innovation Cell" has organised a visit to "Dr. A. P. J. Abdul Kalam Science Centre, Loni". Along with the 5 faculty members, 50 students from Science and Commerce streams of our college participated in this visit on**11th Oct., 2021.**

Prof. Sudam Tupe, head of the Dr. A. P. J. Abdul Kalam Science Centre, Loniintroduced the centre and imparted the science knowledge to the students.

Objectives:

- To develop science temper within the students.
- To undertake the experiential learning through caring out experiments.

Details of Programme:

Prof. Sudam Tupe guided the students in Science Centre.He also demonstrated some of the experiments such as Gravity well, Jumping disc, Virtual harp, Curie point, Hot and cold plate, Colour shadow, Moire pattern, Fun mirror, Acrobatic stick, Plasma globe etc. through videos and slideshows. Students also experienced the experimental learning by carrying out some of the simple experiments by their own.

Outcomes:

Through this visit students have gained following outcomes.

- Students gained scientific knowledge.

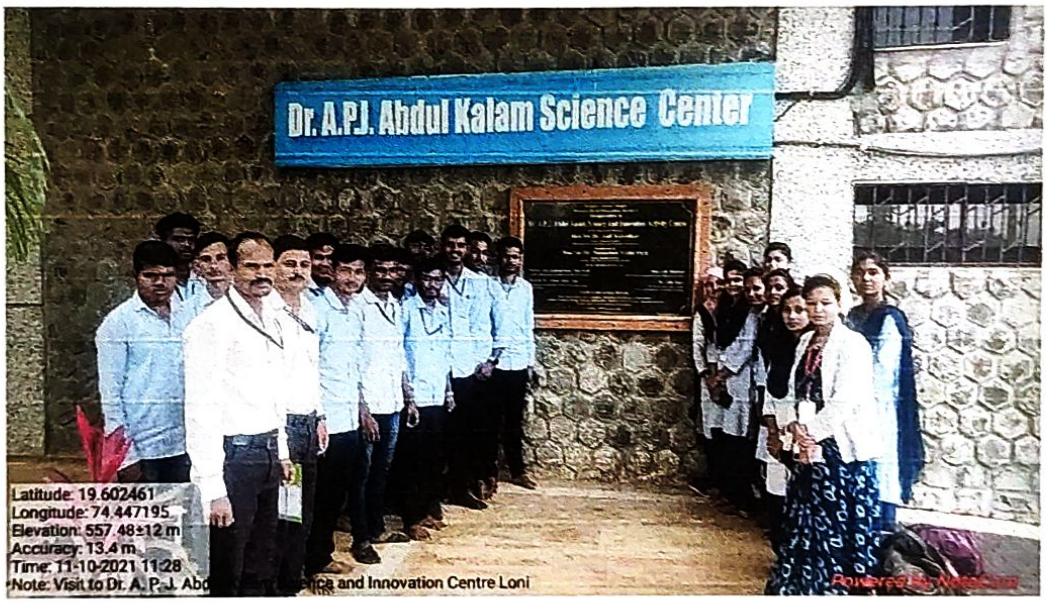
- Students gained experimental knowledge.
- Scientific temper was developed among the students.

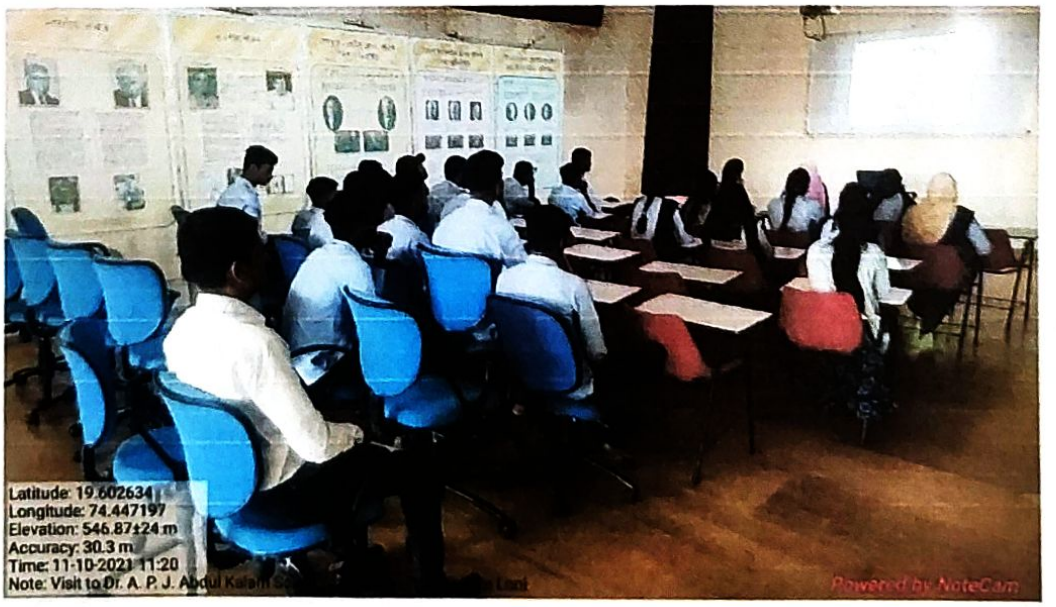
On behalf of Start-up and Innovation Cell, Arts, Science and Commerce College, Kolhar we are very thankful to Prof. Sudam Tupe, Dr. A. P. J. Abdul Kalam Science Centre, Lonifor giving opportunity to visit the science centre.

Metrics:

Number of students participated:50
Number of Teachers: 05

PHOTO GALLERY





Head
Startup and Innovation Cell
Arts, Science and Commerce College, Kolhar

Arts, Science & Commerce College Kolhar Tal.Rahata, Dist.A'Nagar

PRINCIPAL
ARTS, SCIENCE & COMMERCE COLLEGE
KOLHAR. TAL. RAHATA. DIST. AHMEDNAGAR

LOKNETE DR. BALASAHEB VIKHE PATIL
(PADMA BHUSHAN AWARDEE)
PRAVARA RURAL EDUCATION SOCIETY
ARTS, SCIENCE & COMMERCE COLLEGE
KOLHAR
Tal. Rahata, Dist. Ahmednagar, Pin - 413 710
NAAC Accredited at 'A' Grade with CGPA 3.10

A Visit to Dr. A. P. J. Abdul Kalam Science Centre, Loni

Student Attendance

Sr. No.	Name of Student	Signature
1)	Charan Krushna Laxman.	Krushna
2]	Anap Saurabh Sahebrao	SAnap
3)	Kachare Swapnil Vilas	Swapnil
4)	~~Mali Akash Subhash~~	[illegible]
5)	pandore Ganesh kailasing	Ganesh.
6)	Bachhav Mukesh Narsinhrao	[illegible]
7]	Tokade Nikhil Babasaheb	Tokade
8)	Raut Nikhil Ashok	Raut N.A.
9)	Shinde Ravindra Kailas	Ravindra
10]	Musmade chetan Haribhau	[illegible]
11)	Gadhe Dnyanesh Somnath	[illegible]
12]	Pathan Zaid Firdous	Zaid
13]	Shaikh Tasim Husen	[illegible]
14]	Dale Sanika Hemant	[illegible]
15]	Raut Bhagyashri Vilas	Braut
16]	Shelke Vaishnavi Dnyandev	[illegible]
17]	Patel Masira Shakir	[illegible]
18]	Pathan Saniya Jakir	Pathan.
19]	Dale Sharda Bhausaheb	[illegible]
20]	Bhagwat kalyani santosh	[illegible]
21).	Sayyad Aftab Musa	Aftab
22)	Tekade Kunal Appasaheb	[illegible]
23)	Lokhande Sandesh kiran	Sandy
24)	Bramhane Rohit Balasaheb	Bramhane
25)	Pathan simran Parvej	Pathan

LOKNETE DR. BALASAHEB VIKHE PATIL
(PADMA BHUSHAN AWARDEE)
PRAVARA RURAL EDUCATION SOCIETY
ARTS, SCIENCE & COMMERCE COLLEGE
KOLHAR
Tal. Rahata, Dist. Ahmednagar, Pin - 413 710
NAAC Accredited at 'A' Grade with CGPA 3.10

A Visit to Dr. A. P. J. Abdul Kalam Science Centre, Loni

Student Attendance

Sr. No.	Name of Student	Signature
1]	Shirsath Abhay Somnath	Abhay.
2)	Anap Vishal Sunil	Vishal
3	Lokhande Vrushabh Gokul	
4.	Kapse Vinayak Arun	Vinayak
5)	Patel Noman Nasir	Noman.
6]	Bellad Dnyaneshwari Dilip	
7]	Karkute Nikhil Kiran	
8]	Vithor Abhishek Gorakshanath	
9)	Bhosale Vaibhav Prakash	Vaibhav
10	Khamkar Mahesh Ahilyasaheb	Mahesh
11	Jape Chetan Ramesh	
12]	Kapse Prasad Kashinath	
13	Phonde Vikas Rajendra.	
14)	Lokhande Shubham Sambhaji	Shubham S.L.
15	Chilkare Sakshi Vijay.	Sakshi
16]	Thorat Bhagyashri Sukhadev	B.S. Thorat
17]	Kale Aarti Prakash	Kale
18)	Ghodke Narayan Santosh	Ghodke
19)	Shedale Vishakha Vishnu	
20)	Anap Yashswi Subhash	Anap
21)	Thete Prajakta Rajaram	Thete
22	Shirsath Shweta Popat	Shweta
23	Bhosale Shreya Bhausaheb	Shreya
24.	Tandel Sajeda A.	
25.	Patel Noman N.	Patel

Loknete Dr. Balasaheb Vikhe Patil (Padmabhushan Awardee)

Pravara Rural Education Society's

ARTS, SCIENCE AND COMMERCE, COLLEGE, KOLHAR

Tal. - Rahata, Dist. –Ahmednagar (MS) Pin - 413713

One Day Virtual International Multidisciplinary Conference

on

RECENT ADVANCES IN HUMANITIES, COMMERCE AND SCIENCE (RAHCS-2022)

Day-Thursday, Date: 10th February, 2022

Organized by

Internal Quality Assurance Cell

Arts, Science and Commerce College, Kolhar

In Collaboration with

Savitribai Phule Pune University, Pune

INDEX

Date: 02/09/2021

To,
The Principal,
Arts, Science and Commerce College, Kolhar
Tal- Rahata, Dist- Ahmednagar.

Subject: Regarding permission to organize One Day Virtual Multidisciplinary International Conference

Respected Sir,

With reference to above mentioned subject, IQAC and all the departments plan to organize One Day Virtual Multidisciplinary International Conference on Recent Advances in Humanities, Commerce and Science in collaboration of Savitribai Phule Pune University, Pune. It is planned to organize in second week of February 2022. In this regards I request you to give the permission for the organization of the conference.

Thanking you,

Yours faithfully,

Mr. P.H. Vikhe
IQAC, Coordinator

NAAC/IQAC
As per Need.

LOKNETE DR. BALASAHEB VIKHE PATIL
(PADMA BHUSHAN AWARDEE)
PRAVARA RURAL EDUCATION SOCIETY
ARTS, SCIENCE & COMMERCE COLLEGE
KOLHAR
Tal. Rahata, Dist. Ahmednagar, Pin - 413 710
NAAC Accredited at 'A' Grade with CGPA 3.10

Ref : ASCCK/2020-21/ H-D/ 249

Date : 07/09/2021

To

The Director, BOD

Savitribai Phule Pune University

Pune.

Subject: Request to sponsor self-funded International Virtual Conference

Respected Sir,

With reference to the above-mentioned subject, I would like to request you to give permission to conduct International Virtual Conference on **Recent Advances in Humanities, Commerce and Science** on 21st and 22nd October 2021. I would like to receive your sponsorship letter for the same.

Looking forward to your positive response.

Thanking You,

Yours Sincerely

Dr. S.N. Shingote

I/c PRINCIPAL
Arts, Science & Commerce College
Kolhar, Tal.Rahata, Dist.Ahmednagar.

सावित्रीबाई फुले पुणे विद्यापीठ

(पूर्वीचे पुणे विद्यापीठ)

दूरध्वनी क्रमांक :
(०२०)२५६२१२२८
(०२०)२५६२१२२९
ई–मेल : pldvp@unipune.ac.in

गणेशखिंड, पुणे ४११००७.
नियोजन व विकास विभाग

संदर्भ –साफुपुवि/निवि/३८५ दिनांक : २८ सप्टेंबर, २०२१

प्रति,
मा. प्राचार्य
प्रवरा ग्रामीण शिक्षण संस्थेचे
कला, विज्ञान व वाणिज्य महाविद्यालय,
पो. कोल्हार, ता. राहाता,
जिल्हा – अहमदनगर ४१३७१०.

विषय : **गुणवत्ता सुधार योजनेअंतर्गत स्वखर्चाने (Online) आंतरराष्ट्रीय आभासी परिषद आयोजनासाठीचा प्रस्ताव स्विकारून त्यास विद्यापीठ मान्यता मिळणेबाबत.**

संदर्भ : महाविद्यालयाचे पत्र क्र. ASCCK/२०२०–२१/H.D./२४९,दि. २६/०९/२०२१.

महोदय,

वरील संदर्भीय विषयास अनुसरून कळविण्यात येते की, शैक्षणिक वर्ष सन २०२१–२२ मध्ये विद्यापीठाच्या गुणवत्ता सुधार योजनेअंतर्गत अर्थसहाय्याकरिता कोणत्याही महाविद्यालये/परिसंस्थेकडून प्रस्ताव मागविण्यात आलेले नाहीत. तथापि, आपला सदर प्रस्ताव हा स्व–खर्चाने (self-funded) असल्याने सदर योजनेमधील मार्गदर्शक तत्वांचे पालन करून आंतरराष्ट्रीय आभासी परिषदेचे आयोजन करण्यास विद्यापीठाची मान्यता देण्यात येत आहे.

कळावे.

आपली विश्वासू,

२८.९.२१

(डॉ. वैशाली साकोरे)
उपकुलसचिव

Loknete BalasahebVikhe Patil (Padmabhushan Awardee)

Pravara Rural Education Society's

ARTS, SCIENCE & COMMERCE COLLEGE, KOLHAR

AP :Kolhar, Taluka-Rahata, District : Ahmednagar, Maharashtra, India. Pincode : 413710

Affiliated to

Savitribai Phule Pune University, Pune

Virtual International Multidisciplinary Conference on

RECENT ADVANCES IN HUMANITIES, COMMERCE AND SCIENCE

(RAHCS-2022)

10th February 2022

Organized By

Internal Quality Assurance Cell (IQAC)

& Departments of

English	Economics	Geography	Commerce	Library Science
Marathi	Political Science	Zoology	Chemistry	Computer
Hindi	History	Physics	Botany	Mathematics

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Email- apkpune10@gmail.com

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KEYNOTE ADDRESS

Dr. Praveen G. Saptarshi

Visiting Professor

Salisbury University, USA

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I/C Principal, ASC College, Kolhar

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About the Conference

To enhance research and motivate modern techniques and methods, Arts, Science and Commerce College, Kolhar is hosting an International Virtual Conference on **Recent Advances in Humanities, Commerce and Science (AHCS-2022)** scheduled on 10th February 2022. This Conference aims to bring together the research scholars, scientists, entrepreneurs, academicians, students and faculties of humanities, commerce, and science for providing international forum for the discussion of innovative ideas, original research practices and advances in the Modern Era. It also focuses on various trends and paradigms that may be applied to the present practical experiences and creative experiments to the diverse socio-economic, political, and commercial issues.

The key motive of RAHCS-2022 is to provide world class platform to share ingenious ideas and experiences with peers expected to join from different parts of the world. In addition to this the gathering will help the delegates to establish research environment as well as to find the international linkage for future collaboration. We hope that RAHCS-2022 outcome will lead to the significant contributions to the knowledge base and to meet the cutting-edge developments in various fields.

Dear Sir /Madam,

It gives us great pleasure to invite you to participate in one days Virtual International Multidisciplinary Conference on *"Recent Advances in Humanities, Commerce and Science"* on 10th February 2022. The Conference is being organized by Arts, Science and Commerce College, Kolhar, Tal. Rahata, Dist-Ahmednagar (Maharashtra) and is approved bySavitribaiPhule Pune University, Pune.

About the Institute:

Pravara Rural Education Society, Pravaranagar, is one of the most reputed education societies in Maharashtra. It was established in 1964 by **Late Padmashri Dr. VitthalraoVikhe Patil,** the founder father of sugar co-operative movement in India, to cater to the higher educational needs of the rural masses. Arts, Science and Commerce College, Kolhar is an offspring of such renowned institution. Under the leadership of **late Dr. Balasaheb Vikhe Patil** (Padmabhushan Awardee), Former Minister for Heavy Industries and Public Enterprises (Govt. of India). Presently **Hon'ble Shri. RadhakrishnaVikhe Patil**, Chairman, Pravara Rural Education Society, Pravaranagar, Leader of Opposition, Maharashtra Legislative Assembly has shouldered the responsibility of providing the best facilities for the all-round development of students from rural background.

Arts, Science and Commerce College, Kolhar was established in 1999 which is affiliated to Savitribai Phule Pune University, Pune. The college is located at the unique holy shrine of the **Bhagavati Mata** temple, which is between **Shirdi, the holy place of Lord Sai Baba** and **Shani Shingnapur.** The college is accredited by **NAAC at 'A' grade with CGPA-3.10 in May 2015.** It is recognition of great stride made towards the academic excellence.

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हिंदी	डॉ. सीमा राठौर स्नातकोत्तर हिन्दी विभाग, सरदार पटेल विश्वविद्यालय, वल्लभ विद्या नगर-388120 जिल्ला: आनंद, गुजरात	डॉ. प्रकाशचिकुर्डेकर तात्यासाहेब कोरे वारना महाविद्यालय, वरणानगर, जिला कोल्हापुर, महाराष्ट्र	डॉ. हनुमंत दशरथ जगताप अध्यक्ष हिंदी विभाग, न्यू आर्ट स्कॉमर्स अँड सायन्स कॉलज, अहमदनगर
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Botany	Dr. A. S. Wabale Head, Assistant Professor and Research Guide Department of Botany PVP College Pravaranager	Dr. M. N. Kharde Assi. Prof. and Research Guide PVP College, Pravaranagar	Dr.R.D. Borse Head and Associate Professor ACS College, Satral
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Contact Details: (For any Query)

Dr. S. N. Dalimbe (9822629151) **Mr. P. D. Pulate- (9921772482),**

Mrs. S. S. Dhimate– (9834442664) **Dr. P. V. Kanawade- (9922444987)**

SUBJECT THEMES

Marathi	Hindi	English
1) २१ शतकातील मराठी साहित्या पुढीलआव्हाने (कथा, कविता, कादंबरी नाटक आदी साहित्य प्रकारांच्याअनुषंगाने)	१) भाषाकीअस्मिताऔर हिंदीका वैश्विक संदर्भ २) २१ वी सदी मे हिंदी साहित्यके बदलते प्रवाह	1) Recent Trends in English Literature 2) Recent Advances in English Language 3) Translation Studies

Geography	History	Politics
1) Water Resource Conservation and Management. 2) Sustainable Farming Systems and Climate Change 3) Socio-economic and Gender Issues in Natural Resource Management 4) Application of Remote Sensing and GIS in Agriculture Geography	1) New Approaches and Trends in History 2) Challenges in Teaching History 3) Social Reformers in Modern India 4) Feminist Movements in the 20th & 21st centuries	1) Trends in International Politics and Contribution to Peace 2) Changing Trends of India's Foreign Policy 3) Contemporary trends in World Politics 4) Role of Citizens in a Democracy
Economics	**Commerce**	**Mathematics**
1) Present Scenario of Indian and Global Economy 2) Challenges and Prospects in Indian Economy 3) Impact of COVID-19 on Indian Economy 4) MODINOMICS	1) Information Technology in Commerce 2) Human Resource Management and Leadership 3) Financial Management 4) Recent Advances in Commerce and Management	1) Differential Equation and Applications. 2) Applied Algebra 3) Mathematical Modeling and Simulation 4) Numerical Analysis and Methods 5) Fuzzy Mathematics and its Application
Physics	**Chemistry**	**Botany**
1) Recent Improvements for Utilization of Energy Sources. 2) Recent Trends in Material Science Research	1) Environmental and Green Chemistry 2) Agriculture and Food Chemistry 3) Nanotechnology and Material Science 4) Biochemistry and Medicinal Chemistry	1) Advances in Plant Science 2) Agronomy and Agricultural Research 3) Phytomedicine.
Zoology	**Library**	**Computer Science**
1) Biodiversity & Ecology 2) Toxicology and Environment 3) Bio-fertilizer & Organic Farming 4) Human Health & Pathology.	1) Social Media and Applications in Libraries. 2) Copyright and Digital Libraries. 3) Emerging Trends and Technologies in Libraries.	1) Emerging Trends and Innovations in ICT 2) Intelligent Computing and Communication 3) Cyber Security

Note:
Sub themes of the conference broadly cover the aspects of "Sustainable Development Goals & Development: Initiatives, Execution and Challenges" but are not limited to the sub themes explicitly mentioned here. Any other good quality research paper that relates to the focal theme may also be considered for presentation and Publication.

TARGET AUDIENCE

Stakeholder & Student	*Research Scholars*	*Academicians*	*Policy Makers & Regulators.*
NGO's and Registered Society/ Trust	*Geospatial Technologists*	*Environmentalists.*	*Scientist*

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IMPORTANT NOTE		
1	DateofConference	10th Feb 2022
2	Last date of Paper Submission	05th Feb 2022
3	WordLimit	1600-2000
4	PageLimit	4 pages
5	Email for submittingresearchpapers	apkpune10@gmail.com

Registration Link- https://forms.gle/ju2LHRPEoBCj211W9

About Paper Publication:

Authors are invited to submit original papers (not being considered for publication elsewhere) in standard format (that is provided) describing new theoretical and/or experimental research.

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Full paper should be typed in Microsoft Word. The font should be "Times New Roman" with 12 size for matter,16 size in bold for title, 14 size in bold for main headings & 12 size in bold for sub-headings, having line spacing of 1.5 inch and 1 inch custom margin on all sides & A4 Size Paper.

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Full paper should be typed in Microsoft Word in "Unicode" with font size- 14 for content, 16 bold for title & 14 bold for headings, having line spacing of 1.5 inch and 1 inch custom margin on all sides.

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Journal of Research and Development
(ISSN-2230-9578)
A Multidisciplinary International Level Referred Journal Peer-Reviewed Journal
(Print), Impact Factor 7.265

VIRTUAL INTERNATIONAL MULTIDISCIPLINARY CONFERENCE

ON

RECENT ADVANCES IN HUMANITIES, COMMERCE AND SCIENCE

(RAHCS-2022)

Organized by

Internal Quality Assurance Cell (IQAC)

Arts, Science and Commerce College, Kolhar

In Collaboration with

Savitribai Phule Pune University, Pune

Date: 10/02/2022 @IST:11.00am

Inaugural Session

Time	Programme	Speaker/s
11.00 am to11.05 am	Savitribai Phule Pune University Song	ASC College Students
11.05 am to11.15 am	Welcome Address	Dr. Sopan N. Shingote Chief Organizing Secretary I/C Principal, ASC College, Kolhar
11.15 am to11.20 am	Garlanding of Portraits and enlightening of lamp	Chief Guests
11.20 am to11.30 am	Introduction to the Theme of the Conference	Dr. Pratibha V. Kanawade Vice-Principal & HoD, Commerce ASC College, Kolhar
11.30 am to11. 35 am	Introduction of the Chief Guest	Dr. Chandrakant D. Rudrakshe Vice-Principal, ASC College, Kolhar
11.35 am to 11.45am	Inaugural Speech	Hon'ble Dr. Shivanand Hiremath Additional CEO, Loknete Dr. Balasaheb Vikhe Patil (Padmabhushan Awardee) Pravara Rural Education Society, Pravaranagar
11.45 am to 11.55 am	Presidential Speech	Hon'ble Mr. Datta Patil Shirsath Director, Loknete Dr. Balasaheb Vikhe Patil (Padmabhushan Awardee) Pravara Rural Education Society, Pravaranagar
11.55 am to 12.00	Vote of Thanks	Mr. Uttam O. Yewale HoD Dept. of Hindi ASC College, Kolhar
Conducting the Programme		Mrs. Sangita S. Dhimate HoD Dept. of English, ASC College, Kolhar

KEYNOTE ADDRESS

12. 00 to 12.05 pm	Welcome and Introduction of the Guest	Dr. Sopan N. Dalimbe HoD Geography, ASC College, Kolhar
12.05 pm to 12.25 pm	Keynote Address	Dr. Praveen G. Saptarshi Visiting Professor Salisbury University, USA
12.25 pm to 12.30 pm	Vote of Thanks	Dr. Rajendra L. Wadmare HoD Dept. of Marathi ASC College, Kolhar

PLANERY SESSION I

12. 30 to 12.35 pm	Welcome and Introduction of the Guest	Mr. Parmeshwar B. Vikhe IQAC, Coordinator ASC College, Kolhar
12.35 pm to 12.55 pm	Speech by Resource Person	Babalola Ayodele Samuel Dept. of Pure and Applied Zoology, Federal University of Agriculture, Ogun State, Nigeria, Africa
12.55 pm to 01.00 pm	Vote of Thanks	Dr. Prakash D. Pulate Vice-Principal & HoD, Zoology ASC College, Kolhar

PLANERY SESSION II

01.00 pm to 01.05 pm	Welcome and Introduction of the Guest	Mr. Amol K. Kharde Organising Secretary of Conference, ASC College, Kolhar
01.05 pm to 01.25 pm	Speech by Resource Person	Michael OnyemaEdeh HoD, Mathematics and Computer Science, Director ICT, Coal City University, Nigeria, Africa
01.25 pm to 01.30 pm	Vote of Thanks	Mr. Gonde Satish A. HoD Dept. of Economics ASC College, Kolhar
01.30 pm to 02.00 pm	Lunch Break	

PAPER PRESENTATION SESSION III

	Introduction by	Name of the Research Paper Presenter
02.00 pm to 04.00 pm	Mr. Pandurang S. Auti HoD, Politics ASC College, Kolhar	Dr. Sanjeewani Verma, Delhi
		Mr. Gorakhanath Karade, Maharashtra
		Mr. Mohamed Khaled/ J.R. Suryawanshi, Maharashtra
	Mr. Sachin K. Waditke Dept. of Chemistry ASC College, Kolhar	Sampurna Guha and Dr. Nimisha Beri, Punjab
		K. Rajendram, Telangana
		Mr. Nagesh Birajdar, Maharashtra
	Miss Shradhha S. Tambe HoD, Mathematics ASC College, Kolhar	Mr. Vijay Patole, Maharashtra
		Dr. V. Dheenadhayalan and Sandeep A.
		Dr. Bandana Pathak
	Brief by Chairperson of the Session	Dr. Anil B. Pawar HoD, Library Science ASC College, Kolhar
04.00 pm to 04.05 pm	Vote of Thanks of Conference	Mr. Baba Pehere HoD Physics, ASC College, Kolhar

Arts, Science & Commerce College Kolhar Tal. Rahata. Dist. A'Nagar

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Loknete Dr. Balasaheb Vikhe Patil (Padmabhushan Awardee)
Pravara Rural Education Society's
ARTS, SCIENCE AND COMMERCE, COLLEGE, KOLHAR
Tal. - Rahata, Dist. –Ahmednagar (MS) Pin - 413710
Affiliated to Savitribai Phule Pune University, Pune.

Report on

VIRTUAL INTERNATIONAL MULTIDISCIPLINARY CONFERENCE

ON

RECENT ADVANCES IN HUMANITIES, COMMERCE AND SCIENCE

(RAHCS-2022)

Internal Quality Assurance Cell (IQAC) organized one day Virtual International Multidisciplinary conference on Recent Advances in Humanities, Commerce and Science (RAHCS-2022) in collaboration with Savitribai Phule Pune University, Pune on Thursday, 10th February, 2022. The motive of the conference was to provide world class platform to share ingenious ideas and experiences with peers from different parts of the world. It intended to bring together the research scholars, academician, scientists, and faculties of humanities, commerce, and science streams for providing international forum for discussion on recent advances in these streams.

Inaugural function began at IST 11.00 am with Savitribai Phule University song sung by the students of our college. It was followed by the welcome address by Dr. S.N. Shingote, Principal of the college. In his speech, he talked about establishment and development of the institute. Dr. P.V. Kanawade, Vice Principal introduced the theme of the conference. Dr. C.D. Rudraksh introduced the guests present on online and offline platform. Dr. Shivanand Hiremath, Additional CEO of PRES, Mr. Datta Patil Shirsath Dr. Pravin Saptarshi, visiting Professor, Salisbury University, USA and Babalola Ayodele Samuel, Federal University of Agriculture, Nigeria, Africa were present for the inaugural function. Dr. Pravin Saptarshi guided the participants on changing scenario in various stream in India by giving real life examples. Further he said that Dr. Ambedkar and Mahatma Phule were the pioneers of implementing the innovative activities in India. He stated that teachers have adopt the modern changes taking place around the globe and put them innovatively

and deeply before the students of arts, commerce and science. In his presidential speech, Mr. Datta Patil Shirsath talked about the usefulness of such a conference. He also gave best wishes for the conference and motivated the organizers. At the end, Mr. U.O Yewale proposed the vote of thanks of the guests of the inaugural function.

Inaugural function was followed by the keynote address by Dr. Pravin Saptarshi. He was introduced by Dr. Sopan Dalimbe, Head of Department of Geography. In his talk, Dr. Saptarshi focused on Sustainable Farming System and Climate Change. Dr. Rajendra Wadmare proposed the vote of thanks of the resource person.

First plenary session was engaged by Babalola Ayodele Samuel, Federal University of Agriculture, Nigeria. Mr. Parameshwar Vikhe, Coordinator of the conference introduced the resource person. Mr. Babalola guided the participants on Applications of Remote Sensing and GIS in Agricultural Geography Dr. P.D. Pulate, Vice-Principal proposed the vote of thanks of the resource person.

In the second plenary session, Michael OnymaEdeh, Head of Department of Mathematics and Computer Science talked on the topic of Cyber Security. He also focused on the threats of cyber-attack on educational institutes and various types of securities. Mr. Amol Kharde, Organizing Secretory of conference introduced the resource person. Mr. Satish Gonde, Head, Dept. of Economics proposed the vote of thanks of the session.

Third session was engaged by paper presenters. In this session, Dr. Sanjivani Varma, Mr. Gorakhnath Karade, Mr. Mohammad Khalid, Sampurna Guha, K. Rajendram, Dr. V. Dheenadayal etc. presented their research papers. It was followed by question – answer session. This session was coordinated by Mr. P.S. Auti, Mr. Sachin Waditake.

There was fruitful discussion and interaction between participants and the resource persons. 280 participants actively attended the conference. 242 research scholars published their research papers in Journal of Research and Development: A multidisciplinary International Referred Journal. At the end of day, Prof. Baba Peer, Head, Dept. of Physics proposed the vote of thanks. The program ended at 5.45 pm.

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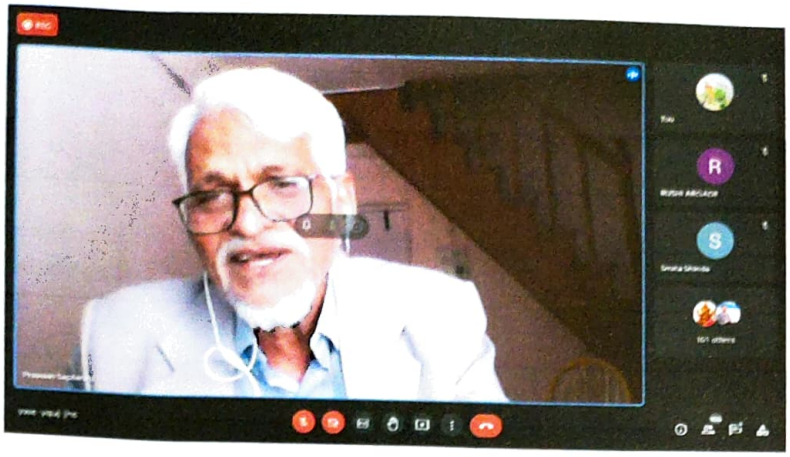
Photograph of the Conference

Inaugural Speech by
Dr. Pravin Saptarshi
Visiting Professor,
Salisbury University, USA

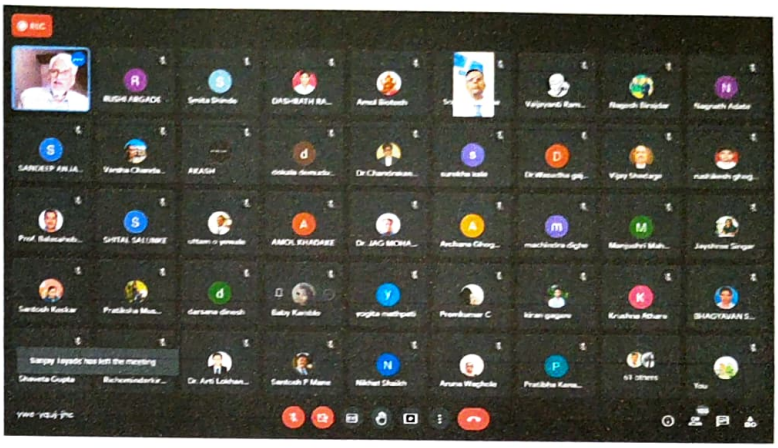
Presidential Speech by
Mr. Datta Patil Shirsath
Director, Pravara Rural
Education Society, Pravaranagar

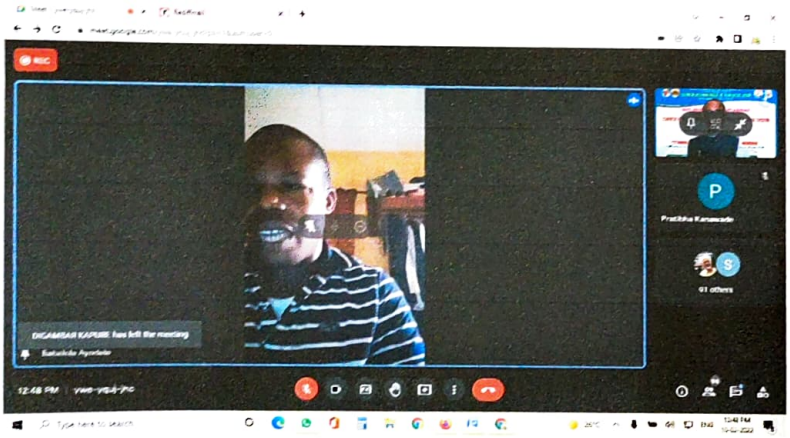
Inaugural Speech by
Dr. Pravin Saptarshi
Visiting Professor,
Salisbury University, USA



Key Note Address by
Dr. Pravin Saptarshi
Visiting Professor,
Salisbury University, USA

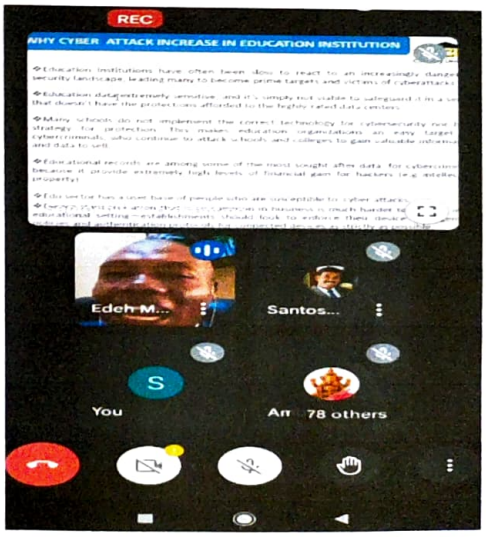
Participants virtually joined through
Google Meet Platform



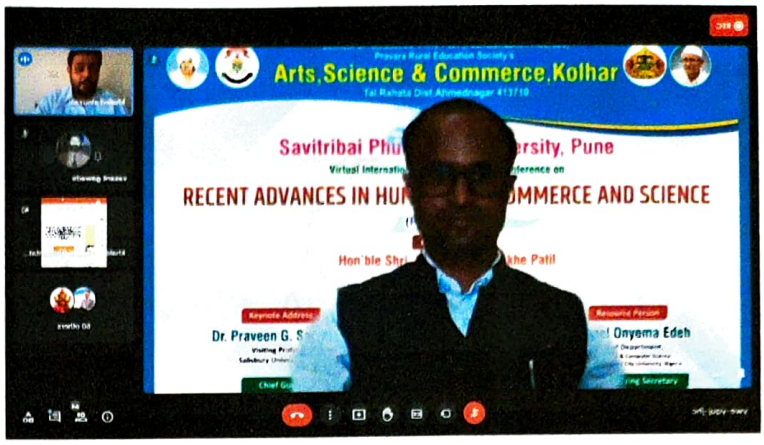


1st Plenary Session by
Babalola Ayodele Samuel
Dept. of Pure and Applied Zoology, Federal University of Agriculture, Ogun State, Nigeria, Africa

2nd Plenary Session by
Michael Onyema Edeh
HoD, Mathematics and Computer Science
Director, ICT, Coal City University
Nigeria, Africa



Research Paper Presentation by Participant



A NEWS Published in Daily Lokmat (Ahmednagar Edition)

लोकमत

प्रवीण सप्तर्षी : कोल्हार येथील महाविद्यालयात एक दिवसीय आंतरराष्ट्रीय परिसंवाद संपन्न

विकासात्मक आधुनिक बदल विद्यार्थ्यांपुढे ठेवावे लागतील

लोकमत न्यूज नेटवर्क

लोणी : भारतामध्ये नावीन्यपूर्ण उपक्रम राबविण्याची मुहूर्तमेढ ही महात्मा जोतिबा फुले, डॉ. बाबासाहेब आंबेडकर यांनी रोवली. सद्य:परिस्थितीत महाविद्यालयामधील कला, वाणिज्य आणि विज्ञान या शाखांमध्ये विकासाच्या दृष्टिकोनातून झालेले आधुनिक बदल हे स्वीकारावे लागतील. त्यासाठी या शाखांचा अभ्यास नावीन्यपूर्णतेने आणि सखोलपणे विद्यार्थ्यांपुढे ठेवावा लागेल, असे मत अमेरिकेतील सॅलिस्बरी विद्यापीठाचे डॉ. प्रवीण सप्तर्षी यांनी व्यक्त केले.

पद्मभूषण डॉ. बाळासाहेब विखे पाटील प्रवरा ग्रामीण शिक्षण संस्थेच्या कोल्हार (ता. राहाता) येथील कला, विज्ञान व वाणिज्य महाविद्यालय व सावित्रीबाई फुले, पुणे विद्यापीठ यांच्या संयुक्त विद्यमाने बुधवारी (दि. १०) एक दिवसीय आंतरराष्ट्रीय परिसंवाद संपन्न झाला. यावेळी सप्तर्षी यांनी हे मत व्यक्त केले. ऑनलाईन व ऑफलाईन अशा पद्धतीने संपन्न झालेल्या परिषदेच्या अध्यक्षस्थानी प्रवरा ग्रामीण शिक्षण संस्थेचे संचालक दत्ता पाटील शिरसाठ होते. तर नायजेरिया येथील फेडरल युनिव्हर्सिटी ऑफ ॲग्रीकल्चरमधील प्राणिशास्त्र विभागाचे प्रा. बाबा लोला, आयोडिल स्युमुअल आणि कोल सिटी युनिव्हर्सिटीचे प्रा. मॅथेमॅटिक्स आणि कॅम्प्युटर सायन्स विभागप्रमुख आणि आयसीटी संचालक मायकेल ओनिमाएड या परिसंवादात सहभागी झाले होते. विविध देशांतून तसेच वेगवेगळ्या राज्यांतील महाविद्यालयातून ३९६ प्राध्यापकांनी या परिसंवादात आपले शोधनिबंध सादर केले. ऑनलाईन प्रणालीद्वारे देशभरातील सुमारे ४०० पेक्षा अधिक जणांनी यात सहभाग नोंदविला. प्राचार्य डॉ. सोपानराव शिंगोटे यांनी या परिसंवादाचे प्रास्ताविक केले. उपप्राचार्या डॉ. प्रतिभा कानवडे यांनी परिषद आयोजनाची भूमिका विषद केली. उपप्राचार्य डॉ. चंद्रकांत रुद्राक्ष यांनी परिसंवादात सहभागी झालेल्यांचा परिचय करून दिला. आभार प्रा. उत्तम येवले यांनी मानले. सूत्रसंचालन संगीता धिमते यांनी केले.

कोल्हार येथील महाविद्यालयातील परिसंवादात प्रवीण सप्तर्षी यांनी ऑनलाईन संवाद साधला.

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Arts, Science and Commerce College, Kolhar

In Collaboration with

Savitribai Phule Pune University, Pune

List of Participants

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18	Desai Vijay Bhimappa	vijaydesai809@gmail.com	7841869092	Economics	Maharashtra
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Multicomponent Approach in Synthesis of Cinnamamides using Boric Acid as a Versatile Catalyst

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Abstract: The synthesis of amide derivatives of cinnamic acid has been described using a simple multi-component reaction (MCR) involving aldehydes, amines and Meldrum's acid using boric acid as catalyst. The reaction takes place under simple operating conditions. The reaction is simple and there is no requirement of other reagent, which are required for the preparation of amides by conventional procedures. The present reaction is more affordable also there is no generation of unwanted chemical by-products that are generally resulting of the use of coupling reagents, oxidants, or catalysts.
Keywords: Multi-component reaction (MCR), catalysts, simple operating conditions, conventional procedures etc.

Introduction:

A functional group with a carbonyl group attached to a nitrogen atom is known as an amides. Amides are generally prepared by the reaction of carboxylic acid with an amine. Amides can be utilised to make structural materials that are both strong and durable (e.g., nylon, Kevlar). An important organic solvent is dimethylformamide. Amido acids are produced by plants for a variety of reasons. Amide derivatives of cinnamic acid which are also called as cinnamamides are a vital class of compounds that has wide range of biological potentials **(Figure. 1., Compounds A-H)**[1–9]. Piper amide and other diversified natural compounds are found to contain cinnamamides as a important core[10]. In the field of medicinal chemistry, a great number of cinnamamides with a wide structural variety have been synthesised to investigate the structure–activity relationship[9].

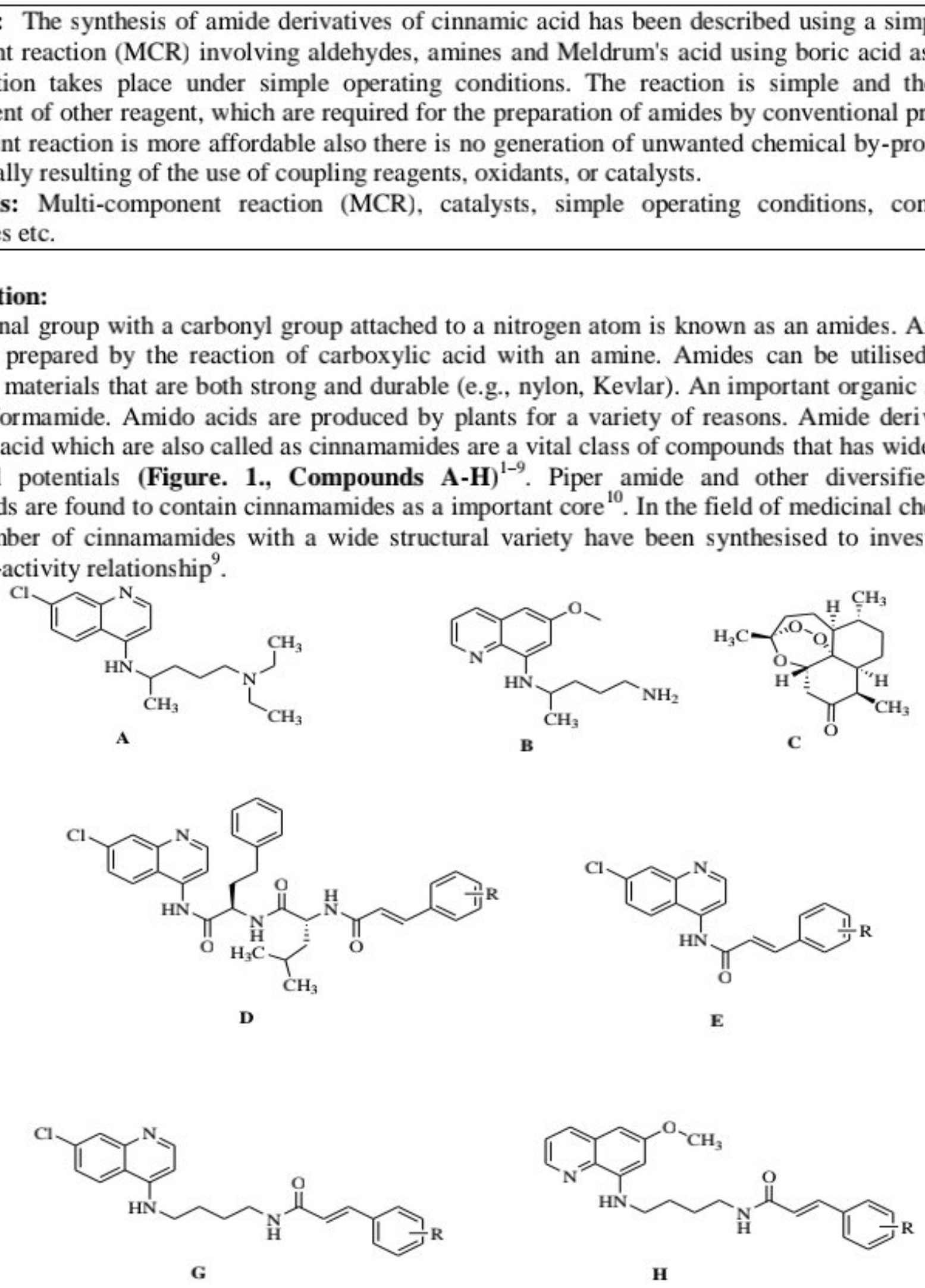
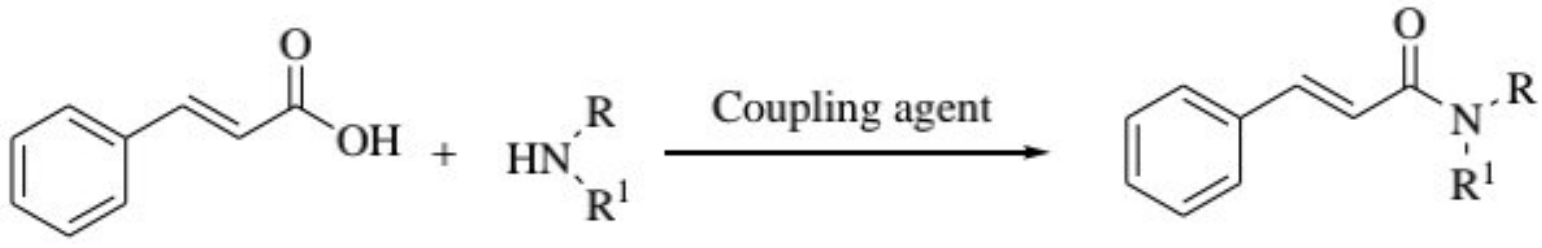


Figure.1. Structures of biologically potential cinnamamide derivatives chloroquine (A), primaquine (B), artemisinin (C), first- (D and E) and second- (G and H) generation heterocycle-cinnamic acids.

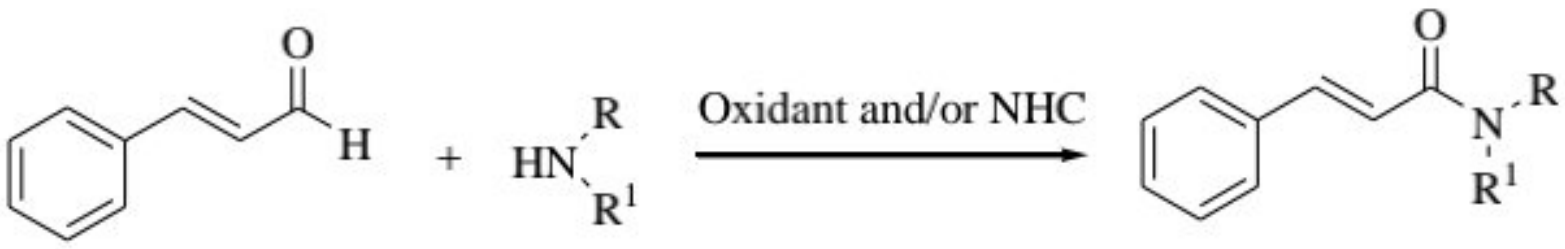
The coupling reaction of cinnamic acid derivatives, which are generated via the Knoevenagel condensation of aromatic aldehydes and malonic acid, is used to make cinnamamides (Scheme 1)[11–15]



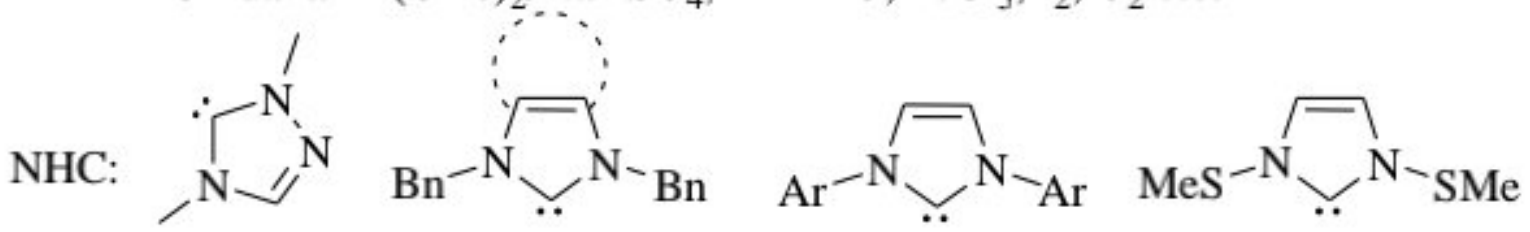
Coupling agent-$SOCl_2$, $(COCl)_2$, HOBT, EDC,
BOP, BBDI, PPh_3/NCBT etc.

Scheme 1. Knoevenagel condensation of aromatic aldehydes and malonic acid for the synthesis of cinnamamides.

Another method for making cinnamamides is oxidative amidation of cinnamaldehydes (Scheme 2)[16–22].

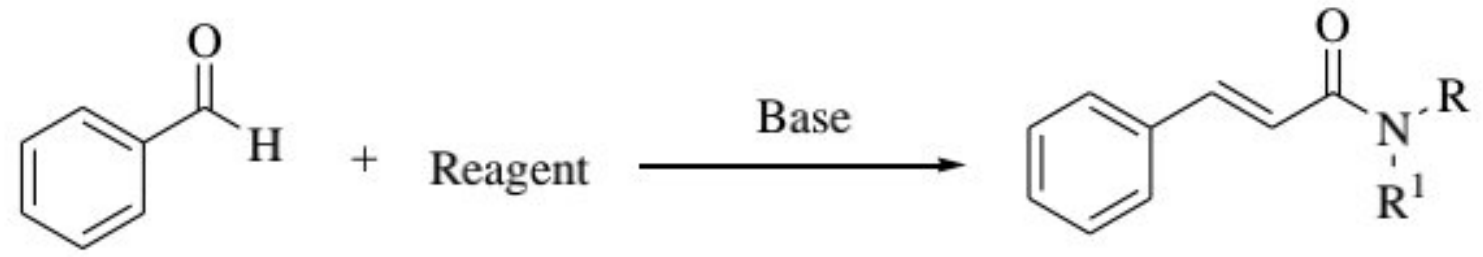


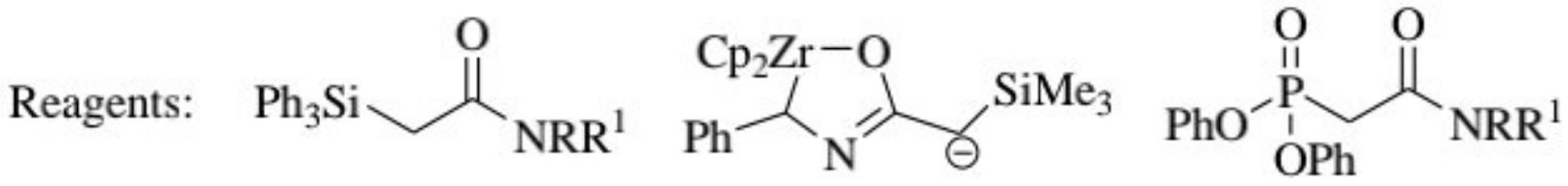
Oxidant: $Ph(OAc)_2$/$NaHSO_4$, TEMPO, $FeCl_3$, I_2, O_2 etc.



Scheme 2. Synthesis of cinnamamides by oxidative amidation of cinnamaldehydes.

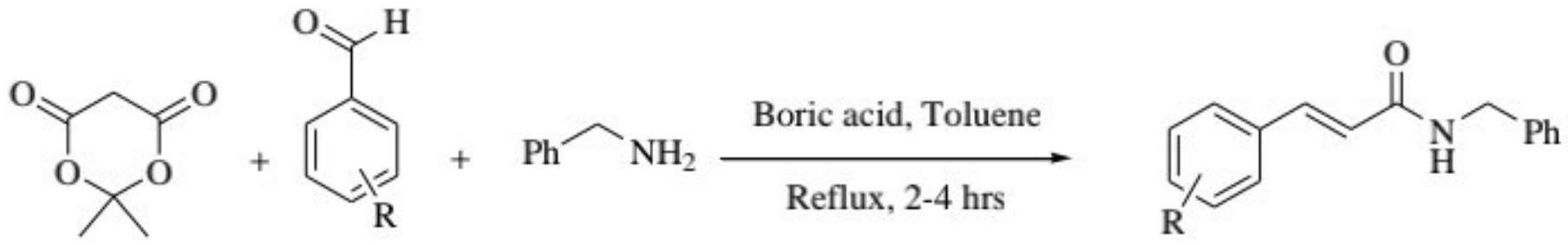
For the synthesis of cinnamamides from aromatic aldehydes, Wittig or Horner–Wadsworth–Emmons reactions were also utilised (Scheme 3)[23–26].





Scheme 3. Synthesis of cinnamamides from aromatic aldehydes

Considering the approaches revelled by the literature survey, it is concluded that the mainstream of the approaches for the synthesis of cinnamamides, deal with multistep which result into several unwanted side products. The coupling agents, oxidants, and phosphine-based reagents have many disadvantages like use of hazardous reagents, harsh reaction condition, elevated temperature etc. Hence there is need to develop new strategy for the synthesis of cinnamamides. The present study describes boric acid as simple catalyst for the synthesis of cinnamamides by the multi-component reaction of Meldrum's acid (1) with aldehyde (2) and amines (3) (Scheme 4). We are surprised for the activity of boric acid as catalyst and hence it is applied for the synthesis of various amide derivatives of cinnamic acids using diversified aldehydes and amines.

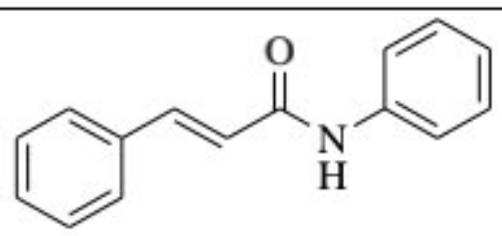
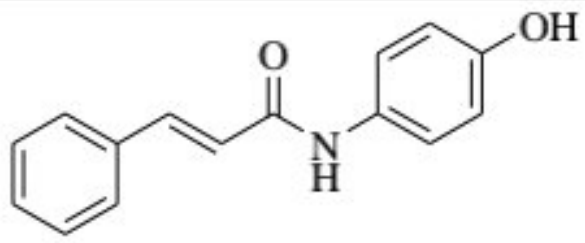
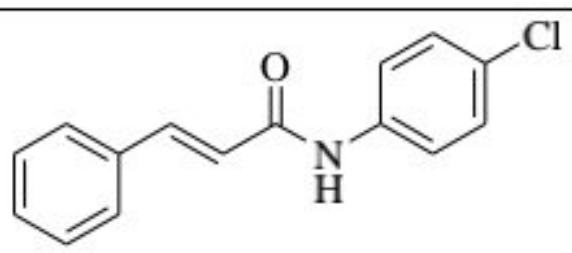
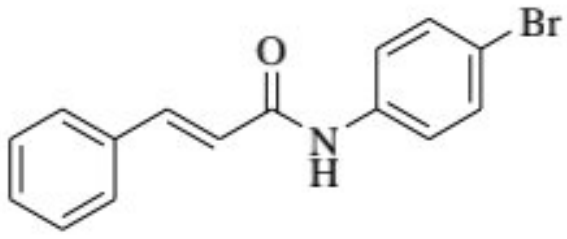
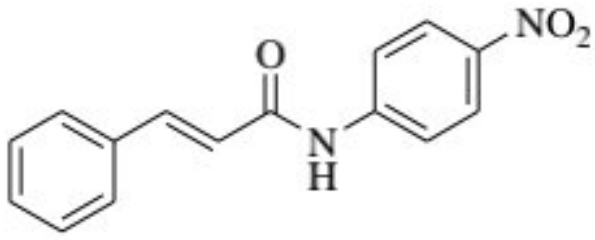
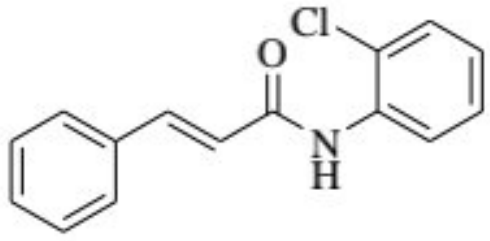


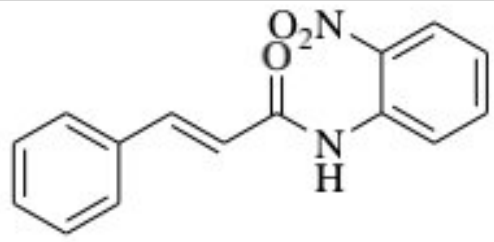
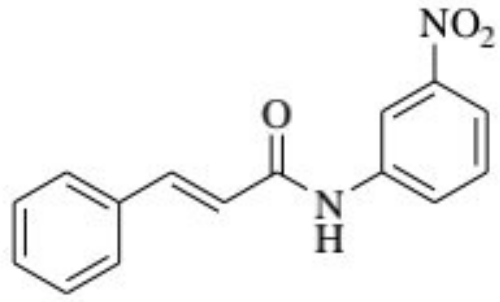
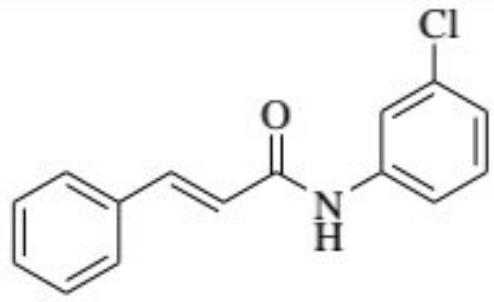
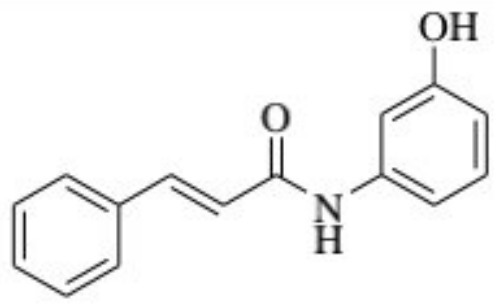
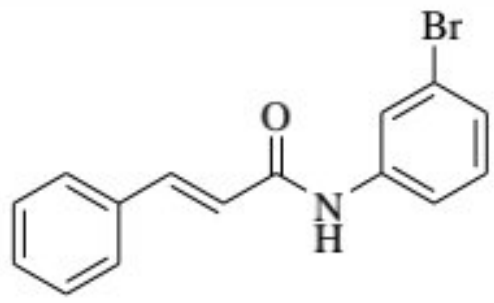
Scheme 3. Synthesis of cinnamamides from aromatic aldehydes, amines and Meldrum's acid.

Result and Discussion:

Different reactions were performed using different aldehydes (2) and amines (3) using Meldrum's acid and our current catalyst (**Scheme 3**). Boric acid was initially applied as catalyst in toluene as a solvent and reflux condition. The time required for reaction to complete was stated in Table 1.

Table 1. Synthesis of different cinnamamides

Entry	Product	Reaction time (h)	Yield (%)
4a		2.2	88
4b		3	92
4c		3.2	78
4d		3.6	83
4e		4	80
4f		2.7	85

4g		2.5	87
4h		3	90
4i		3.6	84
4j		3.1	82
4k		3.4	78

Conclusion:

We are able to create an innovative multi-component reaction using aldehydes, amines, and Meldrum's acid to produce a wide range of cinnamamides with extremely excellent yields that outperform most other approaches. The process allows the production of cinnamamides without the need of unwanted chemical waste-producing coupling reagents, oxidants, or catalysts. The process is atom-efficient, admirable yielding and no by-products. We anticipate that this process will have a wide range of applications, including the quick synthesis of a library of significant cinnamamides.

Experimental:

Materials and methods:

Merck provided high-purity chemical reagents, which were employed without additional purification. Open capillaries were employed to determine melting points, which were utilised without correction. Thin-layer chromatography was used to monitor the reactions, which was done with commercially manufactured 60-mesh silica gel plates and visualised with short wavelength UV light.

General procedure for the synthesis of cinnamamides (4a-k):

To a solution of adehydes (2 mmol) and amines (2 mmol), Meldrum's acid (2 mmol) was added with constant stirring. Then to it 5 ml toluene and catalytic amount of boric acid was added and reaction was refluxed for prescribed time to get cinnamamides. The reaction mixture was then further extracted twice by 5 ml ethyl acetate anf dried to yield cinnamamides.

Spectral data of representative compound:

(4a) N-Phenylcinnamamide-

88% yield

^{1}H NMR (CDCl3, 300 MHz, 298 K) δ (ppm): 10.05 (s, 1H, -NH), 7.88 (m, 10H, Ar-H), 7.75 (d, 1H, J = 15.6 Hz, CH=CH), 6.85 (d, 1H, J = 15.6 Hz, CH=CH).

^{13}C NMR (300 MHz, CDCl3): 165.86 (**C**=O), 141.54 (Ar-**C**H=CH), 140.77, 135.77, 131.42, 129.53, 129.45, 129.02, 123.45 (Ar), 121.02 (CH=**C**H-C=O). Mass- *m/z* = 223 $[M]^+$, 224 $[M + H]^+$.

References:

(1) Dothager, R. S.; Putt, K. S.; Allen, B. J.; Leslie, B. J.; Nesterenko, V.; Hergenrother, P. J. Synthesis and Identification of Small Molecules That Potently Induce Apoptosis in Melanoma Cells through G1 Cell Cycle Arrest. *J. Am. Chem. Soc.* **2005**, *127* (5), 8686–8696.

(2) Peerez, B. C.; Teixeira, C.; Albuquerque, I. S.; Gut, J.; Rosenthal, P. J.; Gomes, J. R. B.; Prudeencio, M.; Gomes, P. N - Cinnamoylated Chloroquine Analogues as Dual-Stage Antimalarial Leads. *J. Med. Chem.* **2012**, *56*, 556−567.

(3) Maiwald, F.; Ben, D.; Charquero, D.; Abad, M.; Erdmann, H.; Preu, L.; Koch, O.; Christoph, H.; Meijer, L.; Comini, M. A.; Kunick, C. 9- and 11-Substituted 4-Azapaullones Are Potent and Selective Inhibitors of African Trypanosoma. *Eur. J. Med. Chem.* **2014**, *83* (2014), 274–283. https://doi.org/10.1016/j.ejmech.2014.06.020.

(4) Sova, M. Antioxidant and Antimicrobial Activities of Cinnamic Acid Derivatives. *Mini-Reviews Med. Chem.* **2012**, *12*, 749–767.

(5) Phuwapraisirisan, P.; Puksasook, T.; Jong-aramruang, J.; Kokpol, U. Phenylethyl Cinnamides : A New Series of a -Glucosidase Inhibitors from the Leaves of Aegle Marmelos. *Bioorg. Med. Chem. Lett.* **2008**, *18*, 4956–4958. https://doi.org/10.1016/j.bmcl.2008.08.024.

(6) Narasimhan, B.; Belsare, D.; Pharande, D.; Mourya, V.; Dhake, A. Esters , Amides and Substituted Derivatives of Cinnamic Acid : Synthesis , Antimicrobial Activity and QSAR Investig ... *Eur. J. Med. Chem.* **2004**, *39*, 827–834. https://doi.org/10.1016/j.ejmech.2004.06.013.

(7) Michalet, S.; Cartier, G.; David, B.; Mariotte, A.; Kaatz, G. W.; Gibbons, S. N - Caffeoylphenalkylamide Derivatives as Bacterial Efflux Pump Inhibitors. *Bioorg. Med. Chem. Lett.* **2007**, *17*, 1755–1758. https://doi.org/10.1016/j.bmcl.2006.12.059.

(8) Waszkielewicz, A. M.; Marona, H. Cinnamamide Derivatives for Central and Peripheral Nervous System Disorders — A Review of Structure – Activity Relationships. *ChemMedChem* **2015**, *10*, 1302–1325. https://doi.org/10.1002/cmdc.201500153.

(9) Gaikwad, N.; Nanduri, S.; Madhavi, Y. V. An Insight into the Pharmacological Advances and Structure e Activity Relationships. *Eur. J. Med. Chem.* **2019**, *181*, 111561. https://doi.org/10.1016/j.ejmech.2019.07.064.

(10) Yankep, E.; Fomumt, Z. T.; Dagne, E. An O-Geranylated Isoflavone from Millettia. *Phytochemistry* **1997**, *46* (3), 591–593.

(11) Shi, Z.; Li, N.; Shi, Q.; Tang, H.; Tang, Y.; Li, W.; Yin, L.; Yang, J.; Duan, J. Synthesis and Structure – Activity Relationship Analysis of Caffeic Acid Amides as Selective Matrix Metalloproteinase Inhibitors. *Bioorg. Med. Chem. Lett.* **2013**, *23* (5), 1206–1211. https://doi.org/10.1016/j.bmcl.2013.01.027.

(12) Sangshetti, J. Sodium Bisulfite as an Efficient and Inexpensive Catalyst for the One-Pot Synthesis of 2 , 4 , 5-Triaryl-1 H - Imidaz ... *Monatshefte fur Chemie* **2008**, *139*, 125–127. https://doi.org/10.1007/s00706-007-0766-3.

(13) Maki, T.; Ishihara, K.; Yamamoto, H. N-Alkyl-4-Boronopyridinium Salts as Thermally Stable and Reusable Amide Condensation Catalysts. *Org. Lett.* **2005**, *7* (22), 5043–5046.

(14) Li, N.; Wang, L.; Zhang, L.; Zhao, W.; Qiao, J.; Xu, X.; Liang, Z. Air-Stable Bis(Pentamethylcyclopentadienyl) Zirconium Perfluorooctanesulfonate as an Efficient and Recyclable Catalyst for the Synthesis of N-Substituted Amides. *ChemCatChem* **2018**, *10* (16), 3532–3538. https://doi.org/10.1002/cctc.201800590.

(15) Ruan, Z.; Lawrence, R. M.; Cooper, C. B. Phenylsilane as an Active Amidation Reagent for the Preparation of Carboxamides and Peptides. *Tetrahedron Lett.* **2006**, *47*, 7649–7651. https://doi.org/10.1016/j.tetlet.2006.08.024.

(16) Wu, Y.; He, H.; Sun, L.; Heureux, A. L.; Chen, J.; Dextraze, P.; Starrett, J. E.; Boissard, C. G.; Gribkoff, V. K.; Natale, J.; Dworetzky, S. I. Synthesis and Structure - Activity Relationship of Acrylamides as KCNQ2 Potassium Channel Openers. *J. Med. Chem.* **2004**, *47*, 2887–2896.

(17) Kumar, T.; Mal, P. Transformation of Contact-Explosives Primary Amines and Iodine (III) into a Successful Chemical Reaction under Solvent-Free Ball Milling Conditions. *Adv. Synth. Catal.* **2015**, *357*, 3977 –3985. https://doi.org/10.1002/adsc.201500914.

(18) Hazarika, N.; Baishya, G.; Phukan, P. Practical Synthesis of N - (Diphenylmethyl) - and N - (1-Adaman- Tyl) Amides Directly from Aldehydes via a One-Pot Schmidt and Ritter Reaction Sequence. *Synthesis (Stuttg).* **2015**, *47*, 2851–2859. https://doi.org/10.1055/s-0034-1380754.

(19) Singh, G.; Dada, R.; Yaragorla, S. TfOH Catalyzed One-Pot Schmidt-Ritter Reaction for the Synthesis of Amides through N-Acylimides. *Tetrahedron Lett.* **2016**, *57* (39), 4424–4427. https://doi.org/10.1016/j.tetlet.2016.08.069.

(20) Kulkarni, S. S.; Hu, X.; Manetsch, R. A Simple Base-Mediated Amidation of Aldehydes with Azides. *Chem. Commun.* **2013**, *49*, 1193–1195. https://doi.org/10.1039/c2cc37289d.

(21) Prasad, V.; Kale, R. R.; Mishra, B. B.; Kumar, D.; Tiwari, V. K. Diacetoxyiodobenzene Mediated One-Pot Synthesis of Diverse Carboxamides from Aldehydes. *Org. Lett.* **2012**, *14* (12), 2936–2939.

(22) Yao, H.; Tang, Y.; Yamamoto, K. Metal-Free Oxidative Amide Formation with N - Hydroxysuccinimide and Hypervalent Iodine Reagents. *Tetrahedron Lett.* **2012**, *53* (38), 5094–5098. https://doi.org/10.1016/j.tetlet.2012.07.024.

(23) Ullaha, S.; Kanga, D.; Leea, S.; Ikramb, M.; Parka, C.; Parka, Y.; Yoonc, S.; Chund, P.; Moon, H. R. Synthesis of Cinnamic Amide Derivatives and Their Anti-Melanogenic Effect in α-MSH-Stimulated B16F10 Melanoma Cells. *Eur. J. Med. Chem.* **2019**, *161*, 78–92. https://doi.org/10.1016/j.ejmech.2018.10.025.

(24) Bautista, R.; Herna, E.; Ferna, M.; Bustos, P. A Convenient Method for the Preparation of Chiral Phosphonoacetamides and Their Horner – Wadsworth – Emmons Reaction. *Tetrahedron Asymmetry* **2007**, *18*, 2427–2436. https://doi.org/10.1016/j.tetasy.2007.09.033.

(25) Gandon, V.; Bertus, P.; Szymoniak, J. New Transformations from a 3-Silyloxy 2-Aza-1 , 3-Diene : Consecutive Zr-Mediated Retro-Brook Rearrangement and Reactions with Electrophiles. *Tetrahedron* **2000**, *56*, 4467–4472.

(26) Kim, S.; Lim, C.; Lee, S.; Lee, S.; Cho, H.; Lee, J.; Shim, D. S.; Park, H. D.; Kim, S. Column Chromatography-Free Solution-Phase Synthesis of a Natural Piper-Amide-like Compound Library. *ACS Comb. Sci.* **2013**, *15* (4), 208–215.

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Lemon Juice (*Citrus Limon*) Mediated Green Protocol for Synthesis of β-Amino Carbonyl Compounds

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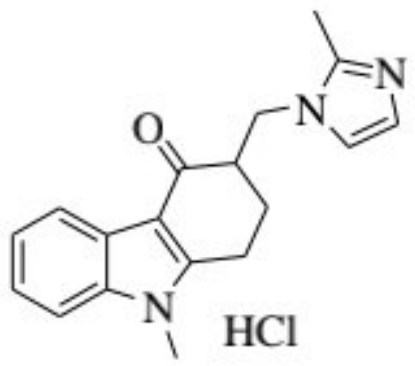
Abstract: In this research paper we propose lemon juice as a green catalyst for the synthesis of β-amino carbonyl compound. This catalyst is efficient, environmentally friendly, natural and biodegradable. A simple and efficient method has been developed for the synthesis of β-amino carbonyl compounds from aromatic aldehydes, aromatic ketones and aromatic amines by Mannich reaction in the presence lemon juice as a catalyst. The advantages of current natural catalyst are inexpensive, high yield, non-hazardous, short reaction times and eliminate hazardous solvents.
Key words: Green synthesis, Lemon juice, Mannich reaction, β-amino carbonyl compounds

Introduction:

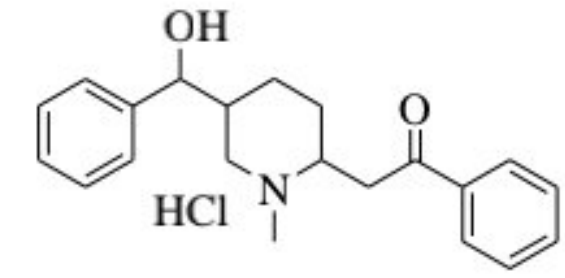
Because of the growing concern over environmental degradation caused by the use of harmful solvents, green chemistry has got a lot of attention in recent years. Green chemistry is called environmentally friendly chemistry because it aims to use procedures that cause the least harm to the environment. The majority of green solvents are derived from renewable and natural resources. Fruit juice has recently been employed as an organic solvent and catalyst in the synthesis of pharmaceutically important compounds. Fruit juices are incomparable solvent because they are readily available, inexpensive, nontoxic, safer, and environmentally benign. Lemon juice is a natural catalyst for the synthesis of β-amino carbonyl compounds and a green alternative to harmful solvents.[1] The Mannich reaction is one of the most important reactions for carbon-carbon bond formation and is a classical route for the preparation of β-amino carbonyl compounds and their derivatives which are important synthetic intermediates for synthesis of biologically active compounds.[2]

The conventional catalyst used for synthesis of β-amino carbonyl compounds using Mannich reactions are Amberlyst-15[3], ionic liquid[4], silica supported sulfuric acid[5], sulfamic acid[6], carbon-based solid acid[7], Bismuth(III) chloride[8], boric acid[9], bromodimethylsulfonium bromide (BDMS)[10]. β-amino carbonyl compounds are more important because they are considerably bioactive. β-amino carbonyl derivatives are used for antibacterial, analgesic, antitumor, anti-inflammatory, antidiabetic and antimycobacterial activities[11]. Ondansetron (**A**) was used to prevent nausea and vomiting caused by radiation and cancer chemotherapy[12]. The plant alkaloid alpha lobeline hydrochloride (lobeline) (**B**) was used to treat asthma and bronchitis[13]. Eperisone hydrochloride and tolperisone hydrochloride (**C**) were extensively used for relaxation of skeletal and vascular smooth muscle (antispasmodic)[14]. Compound (**D**) contains β-amino carbonyl moiety having potential androgen receptor antagonists for early control of prostate cancer[15] **(Figure 1.)**. Here we report an efficient process for synthesis of different β-amino carbonyl compounds using lemon juice as a catalyst via Mannich reaction of aromatic ketones with aromatic aldehydes and aromatic amines.



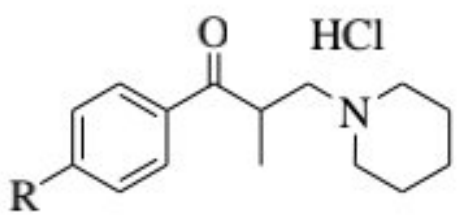
Ondansetron

A



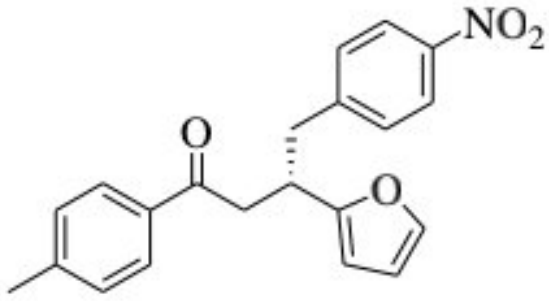
Lobeline

B



$R=CH_3$, Tolperisone
$R=C_2H_5$, Eperisone

C



Anticancer

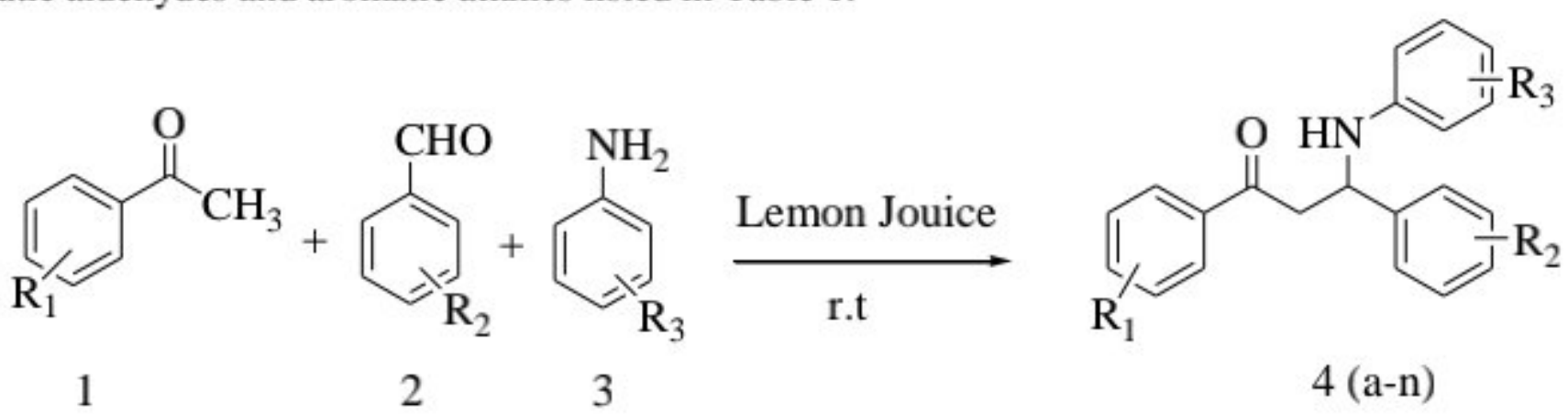
D

Figure 1. β-amino carbonyl derivatives with various biological potential

Results and Discussion:

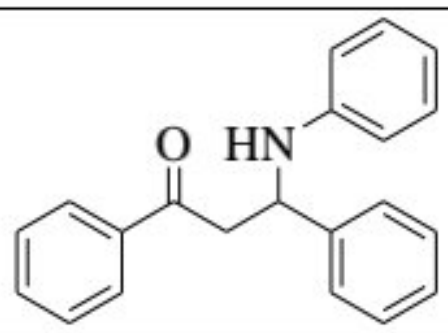
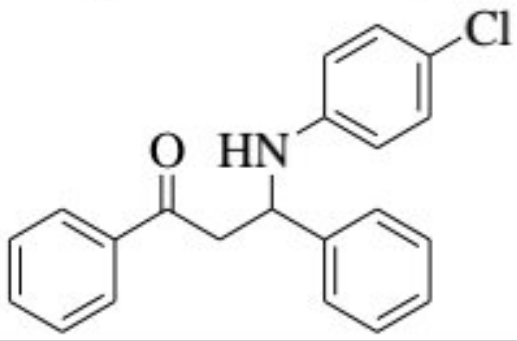
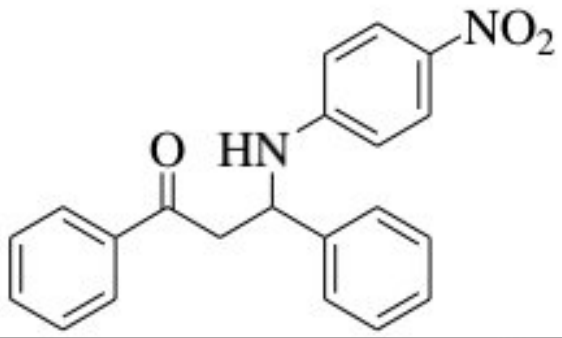
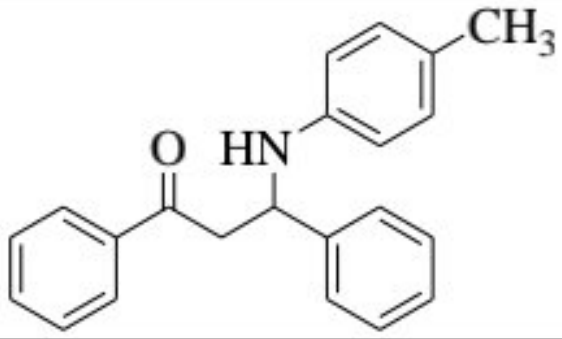
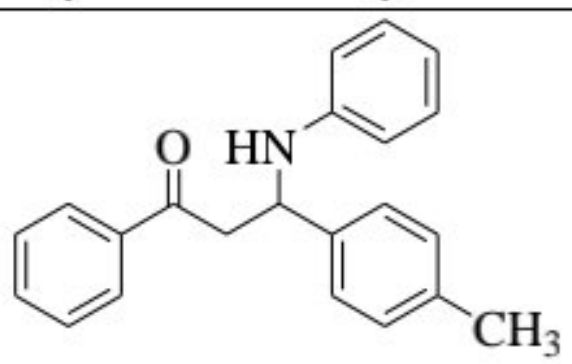
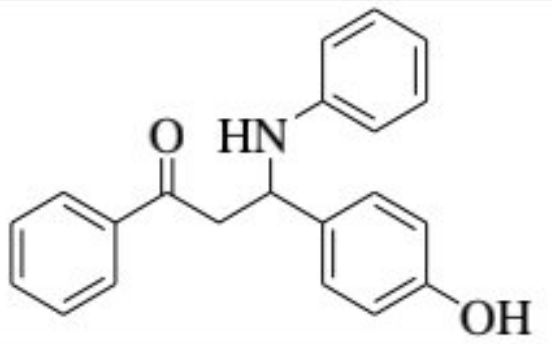
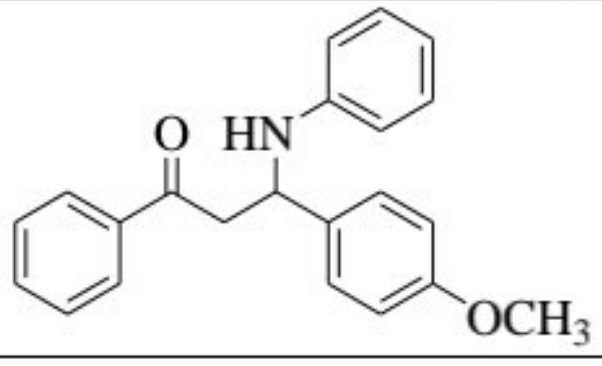
We performed the Mannich reaction for the synthesis of β-amino carbonyl compounds catalyzed by lemon juice **(Scheme 1).** The current synthetic methodology has features such as environmentally benign, mild reaction conditions and an easy work up also the results obtained are discussed. Lemon is a cheap and readily available fruit, with *Citrus Indica, Citrus Limonium,* and *Citrus Aurantium* being the most common *Citrus* species. The sour taste of lemon is due to citric acid which contributes 5-7 % of overall mass of lemon. The other components includes proteins and minerals[16].

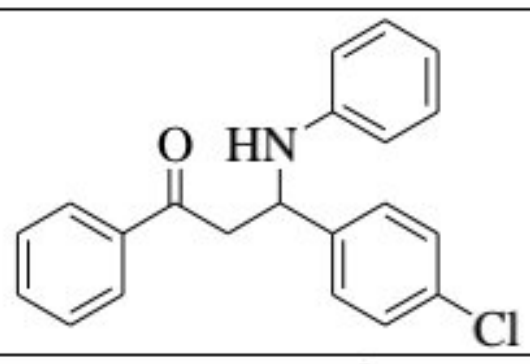
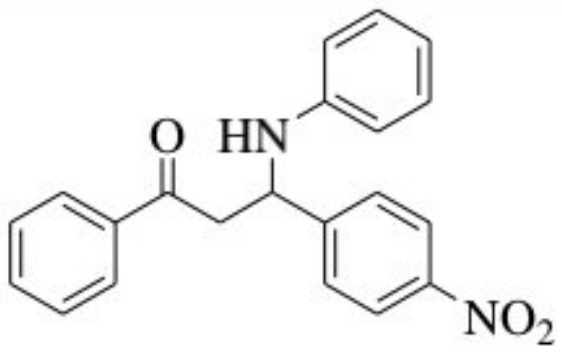
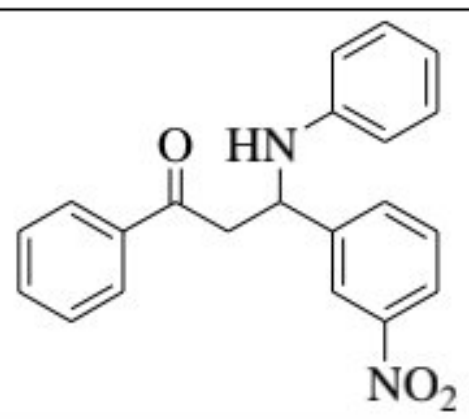
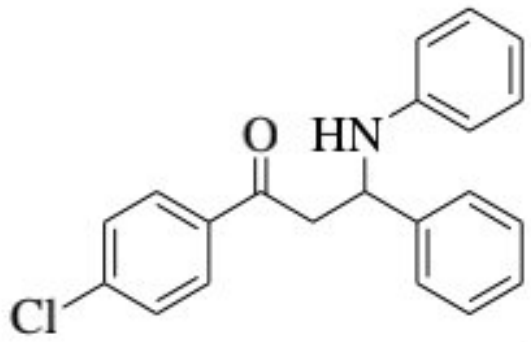
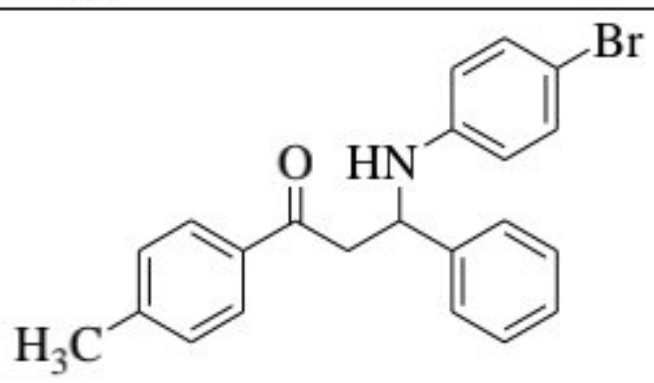
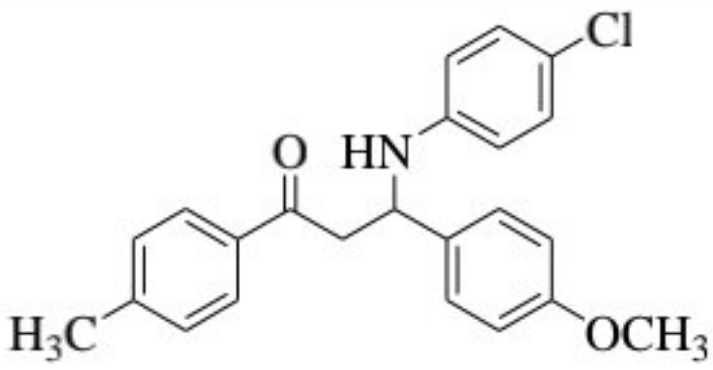
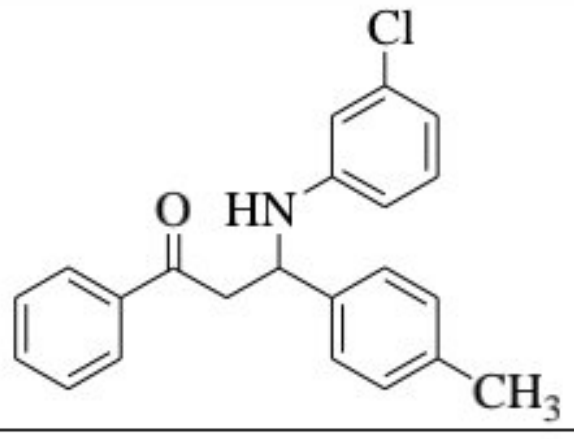
The one pot three component condensations of aromatic ketones, aromatic aldehydes and aromatic amines are achieved in presence of lemon juice as a natural catalyst. Initially the synthesis of compound **4a** was selected as model reaction to optimize the reaction conditions. The reaction was carried out by stirring a mixture of acetophenone (2 mmol), benzaldehyde (2 mmol) and aniline (2 mmol) in presence of lemon juice as a catalyst. A series of β-amino carbonyl compounds were prepared from various aromatic ketones, aromatic aldehydes and aromatic amines listed in Table 1.



Scheme 1. Synthesis of β-amino carbonyl compounds

Table 1. Synthesis of β-amino carbonyl compounds by the reaction of aromatic ketones, aromatic aldehydes with aromatic amines using lemon juice as a catalyst.

Entry	Product	Time (h)	Yield (%)	M.P. (^{o}C)	M.P. (^{o}C) (Ref)
4a		9	88	167-168	169-171[17]
4b		10	86	167-169	170-171[17]
4c		11	90	181-183	184-186[18]
4d		11	91	167-168	170-171[8]
4e		12	89	127-129	129-130[8]
4f		5	92	217-219	220-221[8]
4g		10	87	138-139	142-143[19]

4h		7	85	112-114	114-115[19]
4i		7	86	102-104	105-106[20]
4j		8	89	127-129	131-132[7]
4k		18	86	117-118	119-120[8]
4l		11	91	136-138	139-140[8]
4m		10	88	132-134	136-137[8]
4n		7	85	160-162	163-165[21]

Experimental:

Materials and methods:

Chemical reagents in high purity were purchased from Merck and used without further purification. The melting points were determined by open capillaries and were used uncorrected. The

reaction monitoring was conducted using Thin-layer chromatography was performed using commercially prepared 60-mesh silica gel plates and visualization was effected with short wavelength UV light (254 nm).

Preparation of catalyst:

Fresh lemon was washed completely with water and cut using a knife, after which the pieces were manually pressed. The juice was then filtered through cotton to remove solids and obtain clear juice, which was then used as a catalyst.

General Procedure for synthesis of β-amino carbonyl compounds:

A mixture of aromatic ketones (2 mmol), aromatic aldehydes (2 mmol) and aromatic amines (2 mmol) and catalyst juice (lemon juice) (10 ml) were added and stirred for appropriate time. The progress of the reaction was monitored by TLC. The product was dried and recrystallized to obtain the pure product.

Conclusion:

In conclusion, we have reported a simple and efficient three component process for the synthesis of β-amino carbonyl compounds by condensation of aromatic ketones, aromatic aldehydes and aromatic amines using lemon juice as a catalyst. Lemon juice is useful in organic synthesis because of its acidic properties and enzymatic activity. The advantages of the present catalyst such as environmentally friendly nature, low cost, commercial availability, short reaction time, bio-degradable catalyst, mild reaction conditions, high purity of the products and simple reaction workup make the catalyst efficient in organic synthesis.

References:

(1) Alikhani, A.; Foroughifar, N.; Pasdar, H. Lemon Juice as a Natural Catalyse for Synthesis of Shiff's Base: A Green Chemistry Approach. *Int. J. Adv. Eng. Res. Sci.* **2018**, *5* (2), 61–65. https://doi.org/10.22161/ijaers.5.2.7.

(2) Yekkirala, V.; Sudhagani, R. K.; Panuganti, L. Yttrium (III) Chloride Catalyzed Mannich Reaction: An Efficient Procedure for the Synthesis of β-Amino Carbonyl Compounds. *Org. Commun.* **2015**, *7* (4), 123–129.

(3) Das, B.; Reddy, K. R. Facile One-Pot Multicomponent Synthesis of β-Acetamido Ketones with Amberlyst-15 as Heterogeneous Catalyst. *Helv. Chim. Acta* **2006**, *89* (12), 3109–3111. https://doi.org/10.1002/hlca.200690279.

(4) Gong, K.; Fang, D.; Wang, H. L.; Liu, Z. L. Basic Functionalized Ionic Liquid Catalyzed One-Pot Mannich-Type Reaction: Three Component Synthesis of β-Amino Carbonyl Compounds. *Monatshefte fur Chemie* **2007**, *138* (11), 1195–1198. https://doi.org/10.1007/s00706-007-0767-2.

(5) Khodaei, M. M.; Khosropour, A. R.; Fattahpour, P. A Modified Procedure for the Dakin-West Reaction: An Efficient and Convenient Method for a One-Pot Synthesis of β-Acetamido Ketones Using Silica Sulfuric Acid as Catalyst. *Tetrahedron Lett.* **2005**, *46* (12), 2105–2108. https://doi.org/10.1016/j.tetlet.2005.01.149.

(6) Xia, M.; Lu, Y. D. A Novel Direct and One-Pot Mannich Synthesis of Fluorinated β-Aminobutanones with Sulfamic Acid as a Green Catalyst. *J. Fluor. Chem.* **2006**, *127* (8), 1119–1124. https://doi.org/10.1016/j.jfluchem.2006.05.020.

(7) Davoodnia, A.; Tavakoli-Nishaburi, A.; Tavakoli-Hoseini, N. Carbon-Based Solid Acid Catalyzed One-Pot Mannich Reaction: A Facile Synthesis of β-Amino Carbonyl Compounds. *Bulletin of the Korean Chemical Society*. 2011, pp 635–638. https://doi.org/10.5012/bkcs.2011.32.2.635.

(8) Li, H.; Zeng, H. yao; Shao, H. wu. Bismuth(III) Chloride-Catalyzed One-Pot Mannich Reaction: Three-Component Synthesis of β-Amino Carbonyl Compounds. *Tetrahedron Lett.* **2009**, *50* (49), 6858–6860. https://doi.org/10.1016/j.tetlet.2009.09.131.

(9) Mukhopadhyay, C.; Datta, A.; Butcher, R. J. Highly Efficient One-Pot, Three-Component Mannich Reaction Catalysed by Boric Acid and Glycerol in Water with Major "syn" Diastereoselectivity. *Tetrahedron Lett.* **2009**, *50* (29), 4246–4250. https://doi.org/10.1016/j.tetlet.2009.04.135.

(10) Khan, A. T.; Parvin, T.; Choudhury, L. H. Effects of Substituents in the β-Position of 1,3-Dicarbonyl Compounds in Bromodimethylsulfonium Bromide-Catalyzed Multicomponent Reactions: A Facile Access to Functionalized Piperidines. *J. Org. Chem.* **2008**, *73* (21), 8398–8402. https://doi.org/10.1021/jo8014962.

(11) Prabhakara, M. D.; Maiti, B. Ionic Liquid-Immobilized Proline(s) Organocatalyst-Catalyzed One-Pot Multi-Component Mannich Reaction under Solvent-Free Condition. *Res. Chem. Intermed.* **2020**, *46* (4), 2381–2401. https://doi.org/10.1007/s11164-020-04096-w.

(12) Taylor, L. G.; Bird, S. T.; Sahin, L.; Tassinari, M. S.; Greene, P.; Reichman, M. E.; Andrade, S. E.; Haffenreffer, K.; Toh, S. Antiemetic Use among Pregnant Women in the United States: The

Escalating Use of Ondansetron. *Pharmacoepidemiol. Drug Saf.* **2017**, *26* (5), 592–596. https://doi.org/10.1002/pds.4185.

(13) Glaser, R.; Hug, P.; Drouin, M.; Michelc, A. Solution- and Solid-State Stereochemistry. **1992**, 1071–1079.

(14) Rabbani, G.; Baig, M. H.; Lee, E. J.; Cho, W. K.; Ma, J. Y.; Choi, I. Biophysical Study on the Interaction between Eperisone Hydrochloride and Human Serum Albumin Using Spectroscopic, Calorimetric, and Molecular Docking Analyses. *Mol. Pharm.* **2017**, *14* (5), 1656–1665. https://doi.org/10.1021/acs.molpharmaceut.6b01124.

(15) Donkena, K. V.; Yuan, H.; Young, C. Y. Recent Advances in Understanding Hormonal Therapy Resistant Prostate Cancer. *Curr. Cancer Drug Targets* **2010**, *10* (4), 402–410. https://doi.org/10.2174/156800910791208544.

(16) Tranchida, P. Q.; Bonaccorsi, I.; Dugo, P.; Mondello, L.; Dugo, G. Analysis of Citrus Essential Oils: State of the Art and Future Perspectives. A Review. *Flavour Fragr. J.* **2012**, *27* (2), 98–123. https://doi.org/10.1002/ffj.2089.

(17) Yue, C. B.; Yi, T. F.; Zhu, C. B.; Liu, G. Mannich Reaction Catalyzed by a Novel Catalyst under Solvent-Free Conditions. *J. Ind. Eng. Chem.* **2009**, *15* (5), 653–656. https://doi.org/10.1016/j.jiec.2009.09.038.

(18) Shirini, F.; Akbari-Dadamahaleh, S.; Mohammad-Khah, A. Rice-Husk-Supported FeCl3 Nano-Particles: Introduction of a Mild, Efficient and Reusable Catalyst for Some of the Multi-Component Reactions. *Comptes Rendus Chim.* **2013**, *16* (10), 945–955. https://doi.org/10.1016/j.crci.2013.02.019.

(19) Li, Z.; Ma, X.; Liu, J.; Feng, X.; Tian, G.; Zhu, A. Silica-Supported Aluminum Chloride: A Recyclable and Reusable Catalyst for One-Pot Three-Component Mannich-Type Reactions. *J. Mol. Catal. A Chem.* **2007**, *272* (1–2), 132–135. https://doi.org/10.1016/j.molcata.2007.03.029.

(20) Wang, R.; Li, B. gang; Huang, T. kun; Shi, L.; Lu, X. xia. NbCl5-Catalyzed One-Pot Mannich-Type Reaction: Three Component Synthesis of β-Amino Carbonyl Compounds. *Tetrahedron Lett.* **2007**, *48* (12), 2071–2073. https://doi.org/10.1016/j.tetlet.2007.01.142.

(21) Mansoori, A.; Eshghi, H.; Lari, J. An Efficient Synthesis of 1,3-Diphenyl-3-Phenylamino-Propan-1-One and Its Derivatives by Mannich Reaction in the Presence of Doped Porous Carbon by Nitrogen and Sulfur (NS-PCS) as Catalyst. *J. Chinese Chem. Soc.* **2018**, *65* (5), 548–553. https://doi.org/10.1002/jccs.201700095.

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Study of Chemical Properties of Ground Water in Sangamner area in Ahmednagar Dist., India

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Abstract: In Sangamner area water from wells, river,canal is mostly the source of drinking water. Some villages use bore well water for drinking. Pravara River which runs from most part of Sangamner area contaminates the well water. Also bore well water for most part of region is found to be salty. This water is unhealthy for living part of environment. For this study we have collected 8 samples from the region and analyzed some essential parameter like pH, electrical conductivity, TDS, Alkalinity, Dissolved oxygen, Biochemical oxygen demand, Total Hardness, Calcium, Magnesium, chloride, sodium, potassium, carbonate.

Keywords: Chemical parameter, contamination, Groundwater.

Introduction

Groundwater is generally used as source of drinking water. The increasing demand of this source of water is due to increase in population, high standard of living and industrialization. At the same time above factor results in to pollution of the source day by day. Other factors contributing to pollution of source are excess use of fertilizers and pesticides1. The quality of contaminated sources cannot be regained even by stopping further addition of pollutants. Hence regular monitoring of groundwater is essential. For current study we have selected eight villages on the bank of Pravara River which are affected by river water. The villages like Ashvi Bk, Ashvi Kd, Shipalapur, Panodi, Umbari Balapur, Primpri, Pratapur, Nimgav Jali

Table-1

Sample 1	Ashvi Bk
Sample 2	Ashvi Kd
Sample 3	Shipalapur
Sample 4	, Panodi
Sample 5	Umbari Balapur
Sample 6	Primpri
Sample 7	Pratapur,
Sample 8	Nimgav Jali

Material and Methods:

All the underground water samples were taken from 8 bore wells in selected station of Sangamner area in month of April 2020. Samples were collected in polythene bottles. These samples were analyzed by using standard methods APHA[2,3]. pH was measured with the help of pH meter at 30^0C. The pH meter is previously standardized with the help of pH buffers of 4.0 to 7.0 pH units.

Conductivity is measured with the help of conductivity meter. Total dissolved solid and alkalinity were determined by using soil water analysis kit. Dissolved oxygen and Biochemical oxygen demand were analyzed by using titrametric method. Calcium, Magnesium, chloride, carbonate analysis is done by using volumetric titration method. Sodium and potassium were analyzed by Flame photometry.

Results and Discussion

Alkalinity:

Total alkalinity of groundwater sample ranges from 105 mg/lit to 223 mg/lit. The high value of alkalinity is due to various salts like phosphate, borate, hydroxide, calcium, sodium, bicarbonate and high temperature in summer.

Table-2

Physico-chemical parameters of ground water in Sangamner region

Sr. No	Parameters	Sample-1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	Sample 7	Sample 8
1	pH	7.02	6.80	8.35	7.80	8.56	8.70	9.10	7.97
2	EC mS/cm	927	1025	1470	1218	1279	2387	1138	894

3	TDS mg/lit	785	567	379	827	478	1319	1179	730
4	Alkalinity mg/lit	223	197	187	220	143	298	139	270
5	DO ppm	2.92	4.71	3.65	3.28	6.24	4.85	4.91	6.86
6	BOD ppm	3.99	3.66	4.26	2.96	4.16	3.74	3.55	3.14
7	Calcium mg/lit	176	201	192	155	198	187	224	238
8	Magnesium mg/lit	86	105	78	83	125	79	85	102
9	TH mg/lit	283	265	297	262	290	328	381	280
10	Sodium mg/lit	35	29	41	43	46	38	31	34
11	Potassium mg/lit	8	10	7	12	11	9	12	14
12	Carbonate mg/lit	3.1	4.2	2.7	3.7	4.9	3.5	5.2	4.7
13	Chloride mg/lit	241.8	140.5	174.1	194.3	235.0	287.3	187.5	310.1

pH: The pH value of ground water sample ranges between 6.8 to 9.1.The standard pH value for drinking water is in between 6.5 to 8.5 pH units[5].The pH value of groundwater sample no.7, 8 show higher than prescribed limit and indicate that water is slightly alkaline.

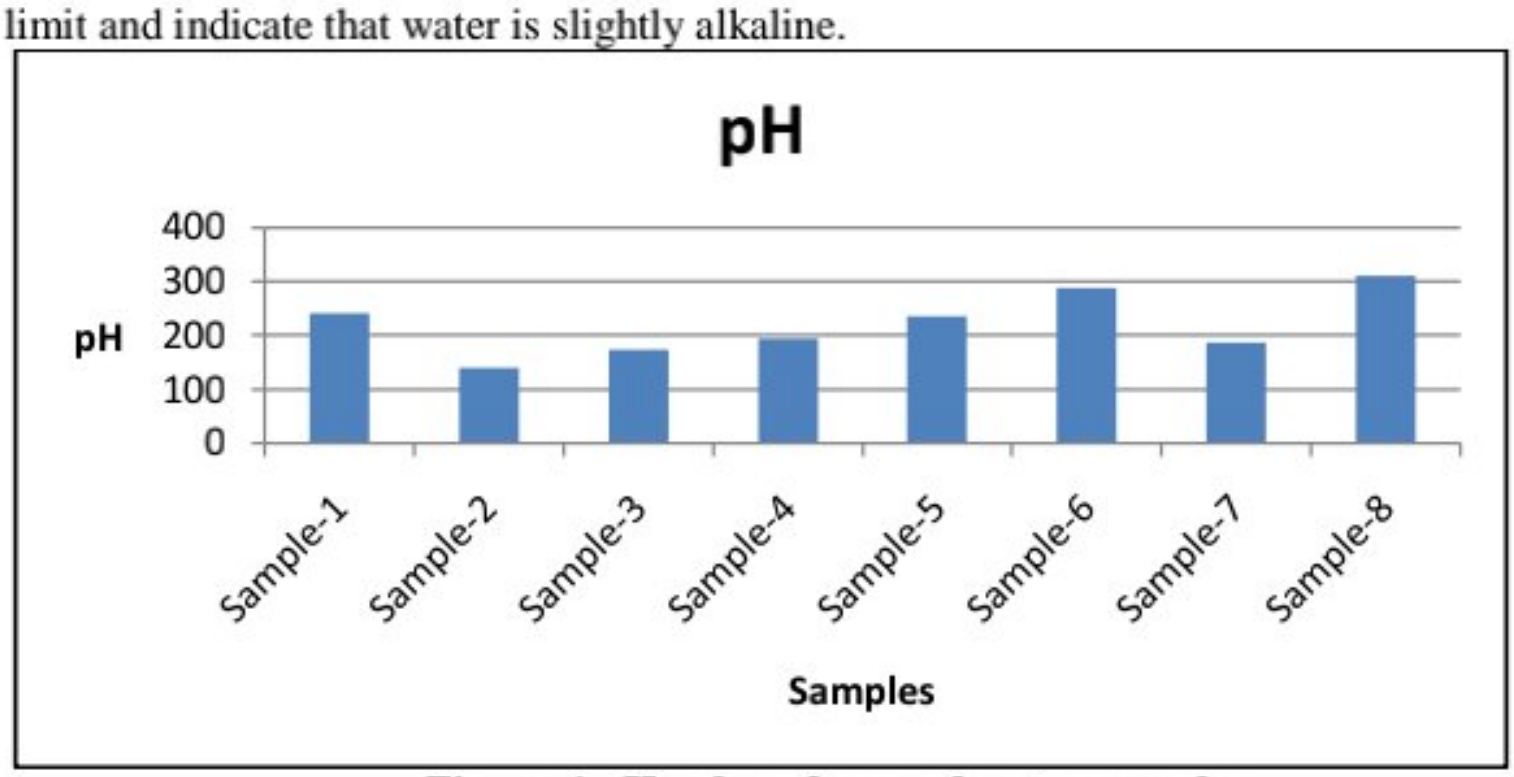


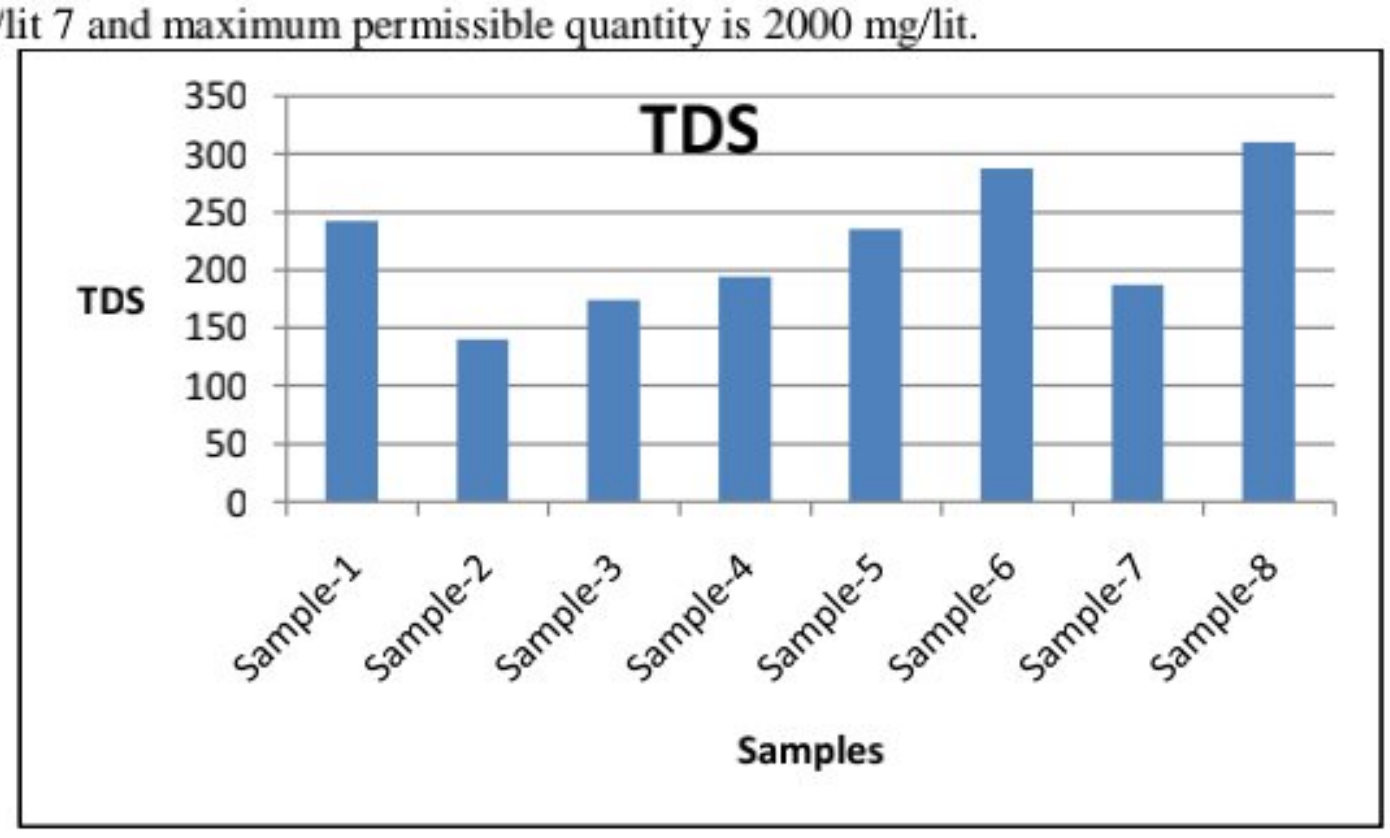
Figure-1 pH value of ground water samples

Electrical conductivity:

Electrical conductivity is useful tool to evaluate the purity of water. Electrical conductivity of ground water is varying from 810 mS/cm to 2556 mS/cm; prescribed limit of Electrical conductivity in drinking water is 2250mS/cm4. The sample no.6 having EC value greater than permissible limit.

Total dissolved solid:

Total dissolved solid means small amount of inorganic and organic matter that are dissolved in water. When the water sample is heated to dryness weight of residue left is TDS 6. TDS value of these water samples are in between 379 mg/lit to 1319 mg/ lit. The standard value for TDS up to 500 mg/lit 7 and maximum permissible quantity is 2000 mg/lit.



Dissolved oxygen: The D.O content of ground water varies from 2.92 ppm to 7.36 ppm.

Biochemical oxygen demand:

The B.O.D of groundwater is ranges from 2.96 ppm to 4.97 ppm. The water having BOD less than 4 ppm are considered to be clean water, where as water having BOD greater than 10 ppm are considered to be polluted water.

Alkalinity:

Total alkalinity of groundwater sample ranges from 105 mg/lit to 223 mg/lit. The high value of alkalinity is due to various salts like phosphate, borate, hydroxide, calcium, sodium, bicarbonate and high temperature in summer8.

In the Sample no.6 (298mg/lit) and in Sample no.8(270mg/lit) having high value of alkalinity due to high temperature in summers or presence of calcium, sodium salts.

Calcium:

Calcium concentration in groundwater sample ranges from 155 mg/lit to 238 mg/lit. The observed range of values is within the limit approved by ICMR

Magnesium:

Magnesium concentration varies from 78 mg/lit to 125 mg/lit and these values are within permissible limit approved by ICMR

Total Hardness:

Total Hardness in water is due to calcium and magnesium and all other cations except alkali metals.Total Hardness is varying from 262 mg/lit to 328 mg/lit. The observed range of values are within the limit approved by ICMR[3,10] except sample no. 7 are considered as hard water.

Sodium and Potassium:

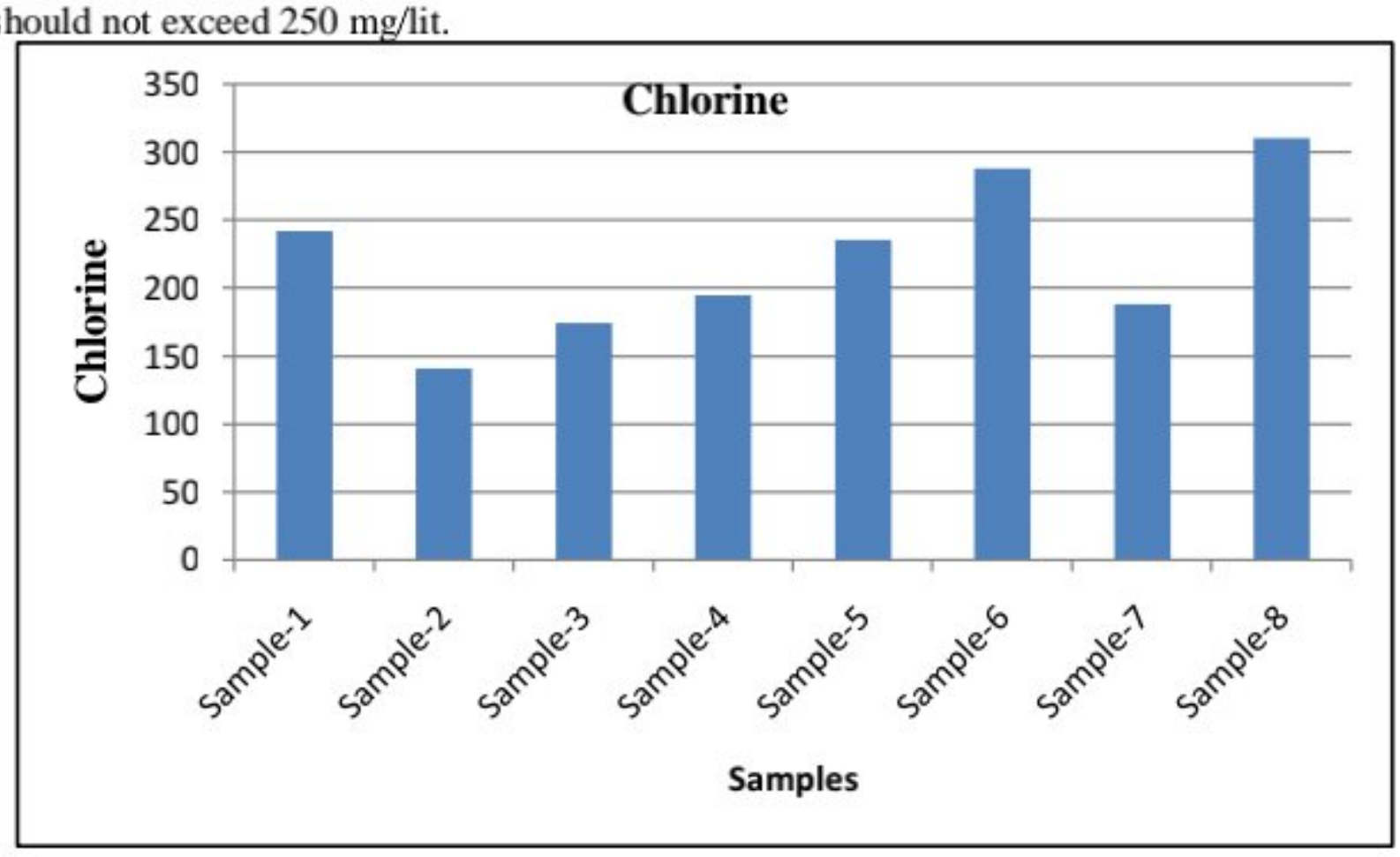
Large amount of sodium and potassium present in water, it combined with chloride to give salty test to water. If these are present in moderate quantity this water is useful for most purposes. Sodium concentration of groundwater samples is varying from 28 mg/lit to 46 mg/lit. Potassium concentration of groundwater sample is varying from 7 mg/lit to 13 mg/lit.

Carbonate:

Carbonate concentration of groundwater samples are varying from 2.7 mg/lit to 5.2 mg/lit.

Chloride:

Chloride concentration of groundwater sample is varying from 99.5 mg/lit to 310.1 mg/lit. The chloride concentration in groundwater above 100 mg/lit gives salty taste to water. Chloride when combine with calcium and magnesium may increase the corrosive activity of water. It is recommended that chloride content should not exceed 250 mg/lit.



Conclusion

The analysis of groundwater sample of Sangamner area shows that pH of sample no.7, 8 are above the prescribed limit. The sample no.5 have electrical conductivity greater than prescribed limit. Total Hardness of sample no. 7 has exceeded the prescribed limit .Calcium concentration in groundwater sample no. 6,7,8

are above the prescribed limit. These sample required treatments to minimize the contaminations. The value of all other parameters of groundwater samples are well within the prescribed limit.

References

1. Priscilla, Kerketta, Sushma Lalita Baxla, Ravuri halley Gora, Suruchi Kumari and Rustom Kumar Roushan, Analysis of physico-chemical propertics and heavy metals in drinking water from different sources in and around
Ranchi, Jharkhand, India, *Original research,* **(2013)**

2. APHA, Standard methods for the examination of water and waste water, *AWWA and WPCF.* **(1998)**

3. Vishal D Joshi, Prajwal R Shetty, Tekeshwar Verma, Vasant D Khasia and Narahari N. Palei, Physico-chemical analysis of ground water of selected area of Rajkot city, *Asian J. Research Chem.* **2(3),** *July-Sept*, **(2009)**

4. Tatawat R.K. and Chandel C.P.S., Quality of ground water of Jaipur city, Rajasthan (India) and its suitability for domestic and Irrigation purpose. *Applied ecology and Environmental Research,* **6(2),** 79-88 **(2008)**

5. ISI. Indian standard specification for drinking water*IS10500.ISI*, New Delhi, **(1983)**

6. Acharya G.D., Hathi M.V., Patel A.D. and Parmar K.C., Chemical properties of groundwater in Bhiloda Taluka Region, North Gujarat, India, *E-Journal of Chemistry*, **5(4),** 792-796, **(2008)**

7. WHO. International Standards for Drinking Water, *WHO,Geneva*. **(1994)**

8. Hujari M.S., Seasonal variation of physico-chemical parameters in the perennial tank of Talsande, Maharashtra, *Ecotoxical. Environ. Monitor*, **18(3),** 233-242 **(2008)**

9. Kurup R., Persaud R., Caesar J. and Raja V., Microbiological and physic-chemical analysis of drinkingwater in Georgetown, Gayana. *Nat.Sci.*, **8(8),** 261-265, **(2011)**

10. http://www.icmr.nic.in**(2014).**

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Advances of Green Chemistry for Sustainable Development

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Abstract:
All areas of Chemistry like Organic,Inorganic ,Biochemistry ,Environmental ,Physical ,Polymer, Drug etc are covered by Green Chemistry. Catalysis, bio-catalysis, and use of alternative renewable feedstock, reaction Medias, reaction conditions and some synthetic pathways can be achieved in Green programs. Green technology is now accepted by government, industry and the public as a necessary goal for achieving societal, economic and environmental objectives. Green chemistry is very important to improve our life, chemical industries and environment.
Green technology is an umbrella term that describes the use of technology and science to create products and services that are environmentally friendly. The goal of green tech is to protect the environment, repair damage done to the environment in the past, and conserve the Earth's natural resources.
Keywords: Green Chemistry, Sustainability, catalysis, bio-catalysis.

Introduction:

Green tech refers to a type of technology that is considered environmentally friendly based on its production process. Green chemistry is defined as the chemistry that designs chemical products and processes that are harmless to the environment, so preventing pollution, some chemical products are remain in the environment after use and they are broken down into harmless component. It can be achieved by reducing the required energy, replacing the organic solvents with water So that we can save money as well as lives[1].Green chemistry is interdisciplinary approach based on chemical ecological and societal responsibility which enables creativity and advancement of innovative research [2].Green chemistry is based on twelve principles by Anastas and Warner[3].

Important 12 principles of Green Chemistry:

1. **Prevention**. It is better to prevent waste formation than to treat it after it is formed.
2. **Atom economy.** Design synthetic methods to maximize incorporation of all material used into final product.
3. **Less hazard**. Synthetic methods should, where practicable, use or generate materials of low human toxicity and environmental impact.
4. **Safer chemicals**. Chemical product design should preserve efficacy whilst reducing toxicity.
5. **Safer solvents**. Avoid auxiliary materials - solvents, extractants - if possible, or otherwise make them innocuous.
6. **Energy efficiency**. Energy requirements should be minimized: conduct synthesis at ambient temperature and pressure.
7. **Renewable feedstocks**. Raw materials should, where practicable, be renewable.
8. **Reduce derivatives**. Unnecessary derivatization should be avoided where possible.
9. **Smart catalysis**. Selectively catalyzed processes are superior to stoichiometric processes.
10. **Degradable design**. Chemical products should be designed to be degradable to innocuous products when disposed of and not be environmentally persistent.
11. **Real-time analysis for pollution prevention**. Monitor processes in real time to avoid excursions leading to the formation of hazardous materials.
12. **Hazard and accident prevention**. Materials used in a chemical process should be chosen to minimize hazard and risk for chemical accidents, such as releases, explosions, and fires.

Recently some advanced trends are used to reduce or eliminate production of substances that are hazardous to human health and environment [4]

a) Some alternative reaction conditions like microwave, ultrasound and light reacting reactions are used.
b) Less toxic ecofriendly chemicals can be designed.
c) Reaction media like water, ionic liquids, and supercritical fluids are used as an alternative to organic chemicals.
d) Highly pure and selective compounds are obtained in the field of catalytic and bio-catalytic reactions [4].
e) Many green technologies aim to reduce emissions of carbon dioxide and other greenhouse gases in order to prevent climate change.
f) Green technologies have the shared goal of preserving biodiversity and conserving the earth's resources, there are few ways to do so without affecting the environment in other ways.

Another Principles of Green Chemistry for Sustainable Development:

1 Prevention is always better than to treat waste after it has been created.

2 Atom economy is related to waste prevention. When yield of product obtained is high, maximum material is converted to product then ultimately reduce the amount of waste. During synthesis of ibuprofen involves only three steps and 99% pure product is obtained.[5,6,7]

3 Recently many synthetic methods can be designed which uses less hazardous chemical substances.

4 Replacing harmful chemicals with safer chemicals makes many processes cleaner and cheaper. [8]

5 Safer solvents and Auxiliaries are used during synthesis. The choice of suitable solvents are based on process safety, environment safety and worker safety. The solvent should be chemically and physically stable. Tomatoes growth can be achieved by extrusion from greenhouse gas, carbon dioxide is used as a tomato seed growth bi-activator.[9]

6 Synthetic methods should be designed in such a way that requirement of energy should be minimized.[10]

7 Use of renewable feedstock is the next principle of green chemistry. Use of biodegradable plastic is the new trend for food industry.[11]

8 Some unnecessary derivatives like blocking groups, protection / deprotection, temporary modification of physical and chemical processes must be minimized if possible because such derivatization require additional reagents and can generate waste.

9 Biodegradable catalyst lowers the activation energy and thus accelerates the rate of reaction.

10 The degradation of product is also crucial so that chemical products are so designed that after the end of their function they break down into innocuous degradation products. [12]

11 Conservation of ecosystem.

12 Development of sustainable society.

13 People are entitled to a healthy and productive life in harmony with nature.

14 Development today must not undermine the development and environment needs of present and future generations.

15 Synthetic methods should be designed in such a way that requirement of energy should be minimized. [10]

16 Use of renewable feedstock is the next principle of green chemistry. Use of biodegradable plastic is the new trend for food industry.[11]

17 Some unnecessary derivatives like blocking groups, protection / deprotection, temporary modification of physical and chemical processes must be minimized if possible because such derivatization require additional reagents and can generate waste.

18 Biodegradable catalyst lowers the activation energy and thus accelerates the rate of reaction.

19 The degradation of product is also crucial so that chemical products are so designed that after the end of their function they break down into innocuous degradation products.

Green Chemistry in Every Day Life:

Chemistry is a big part of our everyday life. One can easily observe this branch of science in different spheres of human life such as in the food we eat, the air we breathe, the various cleansing agents we use, so much so that even human emotions are sometimes a result of chemical reactions within our body! Perchloroethylene is commonly being used as a solvent for green dry cleaning of clothes. PERC contaminates ground water and is a suspected carcinogen. A Micell technology developed by Joseph De Simons, Timothy Romark, and James McClain made use of liquid CO_2 and a surfactant for dry cleaning clothes, thereby replacing PERC. Using this technique Dry cleaning machines have now been developed.[13] Micell Technology evolves a metal cleaning system that uses CO_2 and a surfactant thus eliminating the need of halogenated solvents[14] The paper is manufactured from wood (which contains about 70% polysaccharides and about 30% lignin), for good quality paper, the lignin must be completely removed. Initially, lignin is removed by placing small chipped pieces wood into a bath of sodium hydroxide (NaOH) and sodium sulphide (Na_2S). By this process about 80-90% of lignin is decomposed. The remaining lignin was removed through reaction with chlorine gas (Cl_2). The use of chlorine removes all the lignin (to give good quality white paper) but causes environmental problems. Chlorine reacts with aromatic rings of the lignin produce dioxins, such as 2,3,4-tetrachloropdioxin and chlorinated furans. These compounds are potential carcinogens and cause other health problems. These halogenated products find their way into the food chain and finally into products, pork, beef and fish. So use of chlorine has been discouraged. Subsequently, chlorine dioxide was used. Other bleaching agents like hydrogen per oxide (H_2O_2), ozone (O_3) or oxygen (O_2) also did not give this the desired results. A versatile agent has been developed by Terrence Collins of Camegie Mellon University. It involves the use of H_2O_2 as a bleaching agent in the presence of some activators known as TAML activators that as catalysts which promote the conversion of H_2O_2 into hydroxyl radicals that are involved in oxidation (bleaching). The catalytic of TAML

activators allow H_2O_2 to break down more lignin in a shorter time and at much lower temperature. These bleaching agents find use in laundry and results in lesser use of water.[15]

Chemicals play an important part in our life and we come across many of them in our day to day activities. We are quiet unaware of chemical uses and in this bolg you will see examples of chemicals that keep our life going smooth. These chemicals are used either in combined form or as some reagents.

Sr.No	Common name of the Chemical	Molecular formula & IUPAC name	Uses
1	Baking Powder	$NaHCO_3$;Sodium bicarbonate	Used for baking for cooking ,release co_2 in reaction with the ingredients
2	Soap	Esters	Used for bathing & washing cloths
3	Detergrnt	Sodium sulphate,sodium hydroxide & phosphate compounds	Used for washing cloths
4	Toothpaste	Calcium carbonate,Sodium Flouride	Used for cleaning teeth while brushing
5	Salt	NaCl; Sodium Chloride	Used for seasoning for cooking, also used as preservative
6	Vinegar	$C_2H_4O_2$ acetic acid,ethanoic acid	Used as preservative and for seasoning foods. Utilized for various household cleaning uses.
7	Graphite	Carbon	Used in Pencil
8	Alcohol	$C2H_6$ O Ethanol	Used in alcoholic drink
9	Bleaching Powder	NaOCl	Commonly used domestic bleach, used for cleaning purpose
10	Sugar	$C_{12}H_{22}O_{11}$;Sucrose	Used as cooking sweetner
11	Mouthwash	H_2O_2; hydrogen peroxide,	Used for personal hygiene.

Concluision:

The Aim of green chemistry is to design a chemical processes and products that are harmless to human health and the environment. Green chemistry is based on twelve principles. It is impossible to meet the requirement of all twelve principles but it attempts to apply as many principles as possible. Recently we mainly focused on design an ideas, processes that starts from nonpolluting material. Green chemistry approach will be successful only when proper training and education will be given to new generation.

Referances:

1. Vojvodic V. : Kem Ind 58 (1), 32-33 ,2009
2. Ridanovic L., Catovic F., Ridanovic S.: The Green Chemistry-Ecological Revolution in the Classroom. 8th Research/Expert Conference with International Participations "QUALITY 2013", Neum, B&H , 447-452, 2013.
3. P.T. Anastas, J.C. Warner, Green Chem Theory and Practice, Oxford Univ. Press, New York .1998.
4. Jukic M., Djakovic S., Filipovic- Kovacevic Z., Kovac V. and Vorkapic-Furac J.: Dominant trends of green chemistry. Kem Ind 54 (5): 255-272, 2005.
5. Mijin D., Stankovic M., Petrovic S.: Ibuprofen: Gain and Properties, Hem. Ind. 57 (5) 199-214, 2003.

6. Anastas P. T., Warner J. C.: Green Chemistry Theory and Practice. New York: Oxford University Press, 10-55. 1998.
7. Anastas P. T., Kirchhoff M. M., Williamson, T. C.: Catalysis as a foundational pillar of green chemistry. Appl Catal A: General, 221: 3-13, 2001
8. Ridanovic L., Catovic F., Ridanovic S.: The Green Chemistry-Ecological Revolution in the Classroom. 8th Research/Expert Conference with International Participations "QUALITY 2013", Neum, B&H, June 06 – 08, 447-452, 2013.
9. Garnet, T. (2006): Fruit and vegetables&uk greenhouse gas emissions:exploring the relationship, Centre for environmental strategy, University of Surrey.
10. Hoffert, M. I., Caldeira, K., Benford, G., David R. Criswell, D. R., Christopher Green, C., Herzog, H., Jain, A. K., Kheshgi, H. S., Lackner, K. S., Lewis, J. S., Lightfoot, H. D., Manheimer, W., Mankins, J. C., Mauel, M. E., Perkins, L. J., Schlesinger M. E., Volk, T., Wigley, T.: Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet, Science, Vol. 298, 2002.
11. Ivankovic A., Zeljko K., Talic S., Martinovic Bevanda A. and Lasic M.: Biodegradable packaging in the food industry, 2017.
12. Findrik Blazewic Z.: Bioreactivity Technique I, Internal Script. Zagreb: University of Zagreb, Faculty of Chemical Engineering and Technology, In Croatian, 2013.
13. P.T Anastas and T.C.Williamson, Green Chemistry: Frontiers in Benign chemical Synthesis and Processes. Oxford University Press, Oxford, 1998.
14. J.A. Hall, L.D. Vuocolo, I.D. Suckling, C.P. Horwitz, R.M.Allison, L.J. Wright, and T. Collins; Proceeding of 53rd APPITA Annual Conference, Rotorua, New Zealand, 19-22, 1999.
15. Jesse A., Lisa Alexander, Dylan Mori, Alexander D. Rybov, Terrence J. Collins: New journal of chemistry, 11, 2013.

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A Study on Different Drugs for COVID-19: A Review

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Abstract: The viral diseases occur due to attack of Pathogen on the living being (Human being). There are many examples of viral diseases such as Chickenpox, HIV/AIDS, Viral Pneumonia and recently occurring which is COVID-19 or due to Corona virus. The viral disease is spread by person to person. Viral diseases are also spread through drinking water, also by an animal infected with virus, Eating Food or Water contaminated with a virus. Transmission of the virus can occur from an infected mother to her baby during pregnancy or delivery. In COVID - 19 there is no any cure for this infection disease .They have to discover the drug which posse's antiviral & antibacterial character that helps to cure COVID-19. The enzyme main proteases of SARS COVID-2 that play an important role in the virus cycle seem to be good target. In the present molecular docking method, we use the newly released coordinate structures as targets which are forty (40) approved drug from antiviral, protease, antiparastic, anti-malarial as group ligand.
Keywords: Corona virus, COVID- 19 outbreak, Docking Antibiotics, HIV/AIDS Indinavir, Azithromycin, Clarithromycin, Erythromycin etc.

Introduction:

In 2019-2020 There is respiratory syndrome corona Virus. It is Positive sense signal standard RNA virus that causes a total 75,465 Cases in China. There is Fast spread disease & high Risk of the disease comprises serious life threatening issue in world wide. Fever, cough, shortness of breath are main symptance of disease that may leads to pneumonia. There is no any drug which acutely cure .However the Corona antiviral drug such as inhibitors against protease, integrated & polymerase enzyme designed I are in advanced studied for viral diseases . We take Old drug for which are used for antiviral, Antibacterial diseases such as Indinvair , Azithromycin, clarithromycine , Ritonavir, Remdisiviar etc . In 2019, the Centers for Disease Control and Prevention (CDC) started monitoring the outbreak of a new corona virus, SARS-CoV-2, which causes the respiratory illness now known as COVID-19. Authorities first identified the virus in Wuhan, China. More than 74,000 people have contracted the virus in China. Health authorities have identified many other people with COVID-19 around the world, including many in the United States. On January 31, 2020, the virus passed from one person to another in the U.S. The World Health Organization (WHO) have declared a public health emergency relating to COVID-19.

Method:

A literature review was performed using pub Med and also New English Relevant in English languages. Articles published through March, 2020. There are various terms included viral disease, corona virus, respiratory syndrome as well as treatment. And pharmacology. The Drug is selected by Active clinical trials on corona virus infection.

SARS-COV-2 Virus Activity and Drug Target:

The SARS- COV-2 is a single-stranded RNA- enveloped virus. Which these virus Attack on target cell through the viral structural spike (5) protein and gives receptor binding. The virus cell enter in HOST cell The virus then synthesizes RNA via its RNA-dependent RNA polymerase structural proteins are synthesized leading. Completion of Viral assembly & release Particles. These viral life cycle step provide potential target for drug therapy.

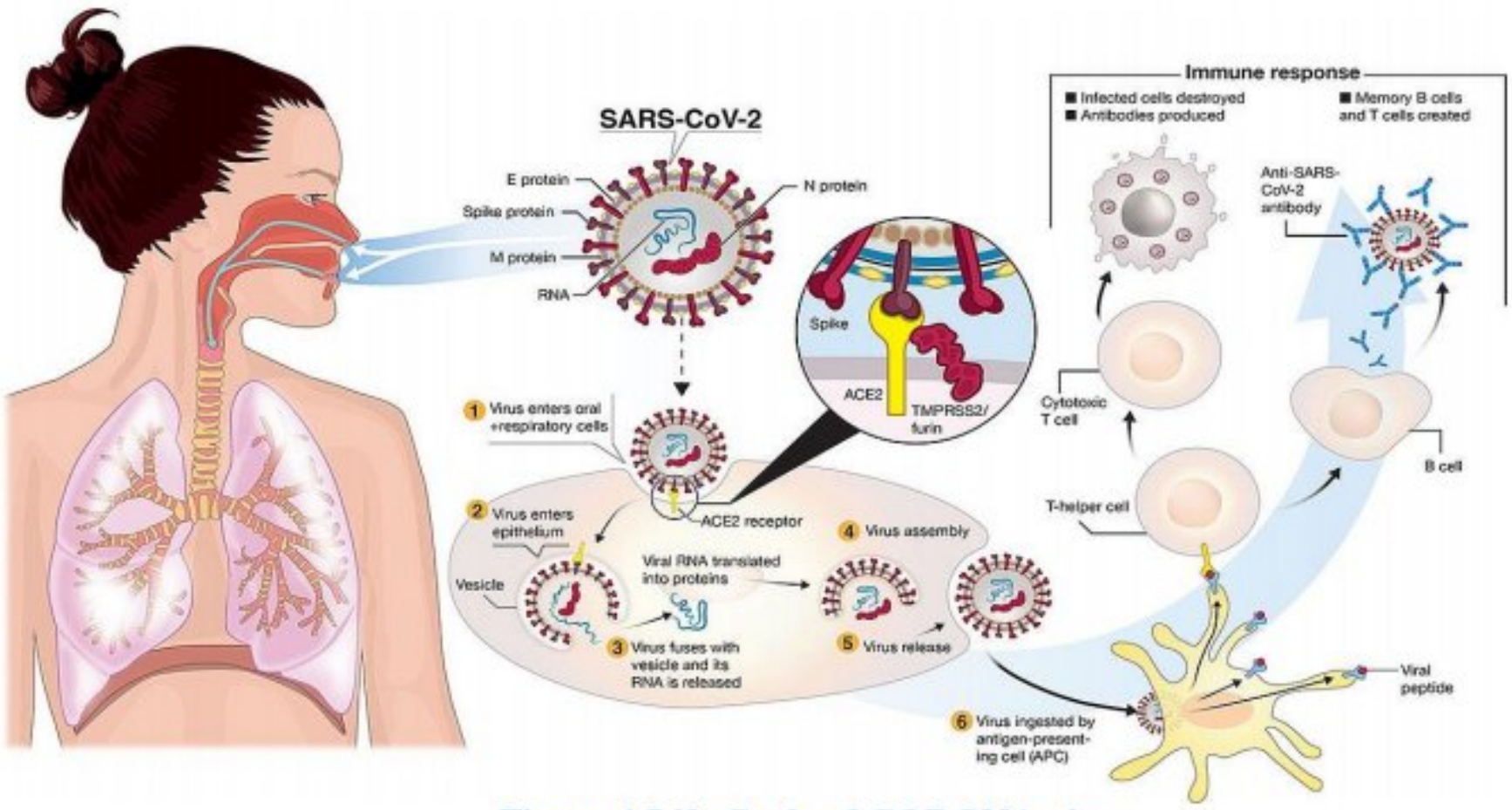


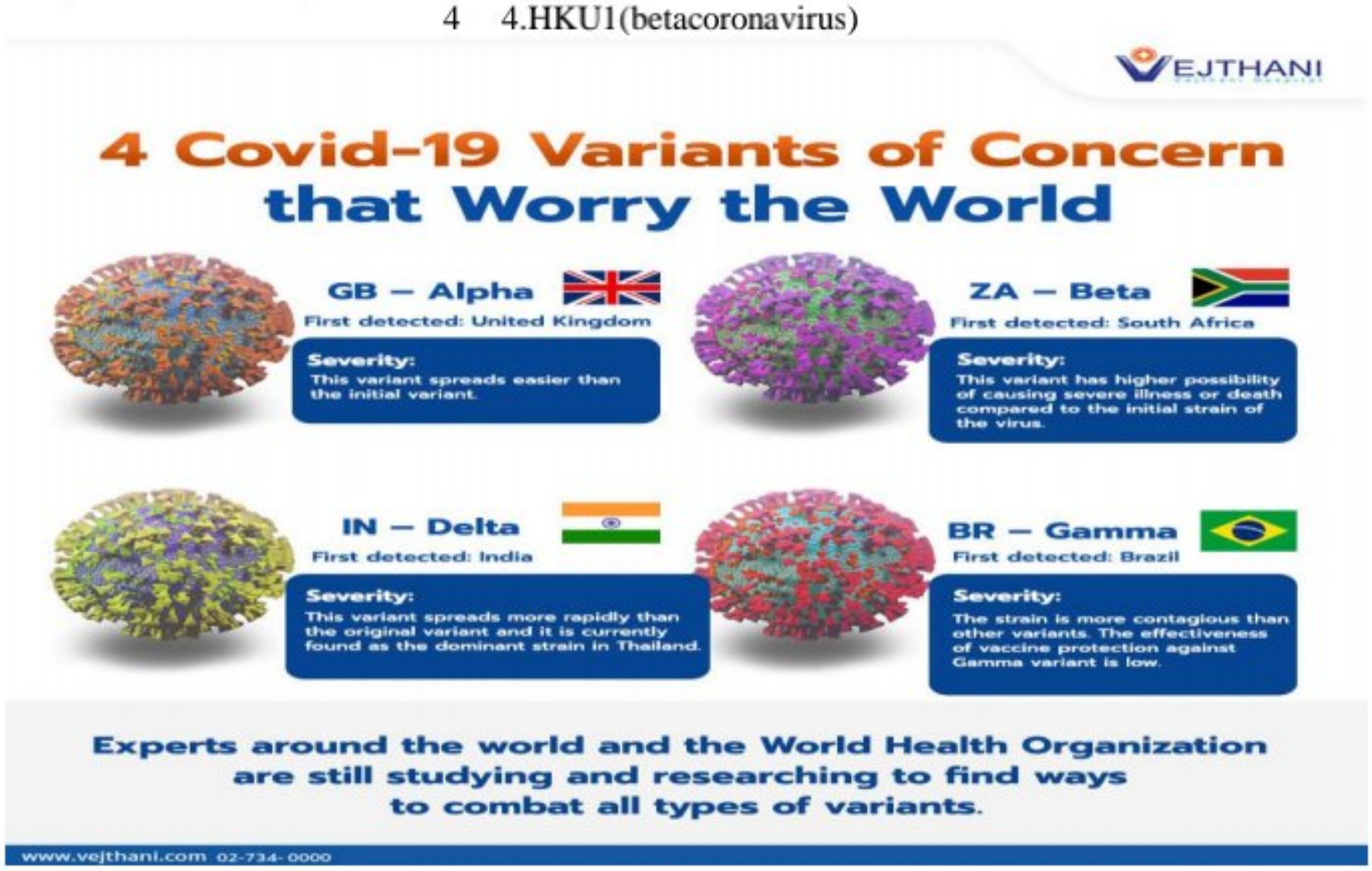
Figure 1 Life Cycle of CORONA virus

Types:

Corona viruses belong to the subfamily Corona variance in the family Corona virus. Different types of human corona viruses vary in how severe the resulting disease becomes, and how far they can spread. Doctors currently recognize seven types of corona virus that can infect human.

Common Type:

1 229E (alpha corona virus)
2 NL63 (alpha corona virus)
3 OC43 (beta corona virus)
4 4.HKU1(betacoronavirus)



Symptoms:

Fever, cough, tiredness, loss of taste or Smell, sore throat. Headache diarrhea red or imitated eyes, loss of speech mobility or confusion, Chest pain People with mild symptoms Healthy should manage their symptoms at Home. We consult with local Authority of medical they also Conclude these Symptoms.

Prevention:

People Follow guideline of Local Authority as well as follow guideline of Suggest by WHO. Maintain wear a safe distance from other, mask in public, Clean your hand by sanitizer soap water. Stay Home if you feel unwell. Get vaccinated when it's your turns.

Blind Docking:

Blind docking a ligand to the whole surface of a protein without any prior knowledge of the target pocket. Blind docking involves several Runs and Several energy calculations before a Favorable protein-ligand complex pose is found.

Individual Analysis of Drugs:

1) Indinavir:

It is protein protease inhibitor used as a component of highly active antiretroviral therapy to treat HIV/AIDS orally. It is soluble White powder administered in combination with antiviral Drug load .Indinavir does not cure HIV/AIDS but it can extend. The length of person's life for several days. Available capsules should be commercially 15-30°C. Stored at The drug is taken by with plenty One or two Hour after meal. It is no longer recommended to use in the United States for initial treatments due to pill burden and risk of kidney stones.

2) Azithromycin :

Azithromycin is an antibiotic medication used for the treatment of a Number of bacterial infection .This include middle ear infection, throat, Pneumonia, travelers diarrhea certain intestinal infection.

3) Clarythromycin and Erythromycin:

The drug sold under the brand name Biaxin among other is an antibiotic used to treat various bacterial infections. This includes strep Throat, pneumonia, Skin infections. Pylori infection Lyme disease among others. Clarithromycin were developing in 1989. & approved Used in 1990 .It clarithromycin is available as generic medication as observed and investigate in local area. It is treating to bacterial disease alternative use to penicillin in strep throat.

4) Ritonavir:

These Drug sold under brand Name Noravir .Which is Antiretroviral Medication for Treat HIV/AIDS .If we take low dose used with other protease inhibitor, It may also used for Hepatitis.C .Ritonavir is taken by mouth. As Per our studied us food and Drug Administration approved oral 21 Combination agent for treating HTV, 22 these drug Demonstrated in vitro activity against corona viruses. No published data for SARS-CoV-2 in Vitro data exist for ritonarvir, the most commonly used & studied. ritonavir dosing regimen for 23 COVID -19 treatment is 400 mg /100mg twice daily for up to 14day . Adverse effect of ritonavir include ate gastrointestinal distress such as nausea & diarrhea & hepato toxicity is observed. In patients with COVID-19, These adverse effect mail be exacerbated by combination therapy or viral infection because approximately 20% to 30% of patient have elevated transaminases as presentation with COVID 19.

5)Hydroxychloroquine:

It is anti-malarial drug .Which is used for treatment on malaria. It is used for prevent malaria infection in areas where other medicines may not work.Hydroxychloroquine may used to treat corona virus (COVID-19)in certain hospitalized patients. Hydroxycholoquine should only used for COVID-19 in hospitals or during clinical trial. China reported that was successfully treat used to treat covid-19, No high-quality evidence exist for the efficiency. of Hydroxyl chloroquine treatment of SARS Dosing of Chloroquine to treat COVID-19 has consist of 50 500 mg Daily once or twice daily No significant adverse effect have been reported for chloroquine at the doses & durations proposed for COVID -19. Pregnancy use of chloroquine at in is generally considered safe. 11, 12 39

Conclusion:

We are tried to study more Cure COVID -19 .There for Investigate that Erythomycine, Clarithromycine ,Indinvir, Azithromycin ,Ritonavir Suggest are for more clinical evaluation & their therapeutic potential.

References:

1) M.R. Dayer Department of Biology, Faculty of Science, Shahid Chamran University of Ahvaz, Ahvaz, Iran

2) Pubchem. "Indinavir". pubchem.ncbi.nlm.nih.gov. Retrieved 2018-10-22.

3) "Crixivan (Indinavir Sulfate): Side Effects, Interactions, Warning, Dosage & Uses". *RxList*. Retrieved 2018-11-08

4) Fischer J, Ganellin CR (2006). Analogue-based Drug Discovery. John Wiley & Sons. p. 509. ISBN 9783527607495

5) "Azithromycin". The American Society of Health-System Pharmacists. Archived from the original on 5 September 2015. Retrieved 1 August 2015.
6) https://www.nature.com/articles/s41598-017-15571-7
7) "Clarithromycin". The American Society of Health-System Pharmacists. Archived from the original on September 3, 2015. Retrieved September 4, 2015.
8) Greenwood D (2008). Antimicrobial drugs : chronicle of a twentieth century medical triumph (1 ed.). Oxford: Oxford University Press. p. 239. ISBN 9780199534845
9) "Norvir- ritonavir tablet, film coated Norvir- ritonavir solution Norvir- ritonavir powder". DailyMed. Retrieved November 17, 2021.
11)Jump up to:[a b c] "Norvir EPAR". European Medicines Agency (EMA). Retrieved August 20, 2020. Text was copied from this source which is © European Medicines Agency. Reproduction is authorized provided the source is acknowledged.
12) Jump up to:[a b c d e f g h i j k] "Ritonavir". The American Society of Health-System Pharmacists. Archived from the original on October 17, 2015. Retrieved October 23, 2015.
13) Chen Z.; Zhang W.; Lu Y et. al.. From SARS-CoV to Wuhan 2019-nCoV Outbreak: Similarity of Early Epidemic and Prediction of Future Trends.: Cell
Press, 2020.
14) Luk H. K., Li X., Fung J., Lau S. K., Woo P. C.(Molecular epidemiology, evolution and phylogenyof SARS coronavirus. Infection, Genetics andEvolution, 2019; 71: 21-30.
15) Collins AR, Knobler RL, Powell H, Buchmeier MJ.Monoclonal antibodies to murine hepattis virus-4(strain JHM) define the viral glycoprotein responsible for attachment and cell—cell fusion. Virology, 1982; 119(2): 358–371.22. Abraham S, Kienzle TE, Lapps W, Brian DA.Deduced sequence of the bovine corona virus spike protein and identification of the internal proteolytic cleavage site. Virology, 1990; 176(1): 296–301.
16) James M. Sanders, PhD, PharmD; Marguerite L. Monogue, PharmD; Tomasz Z. Jodlowski, PharmD; James B. Cutrell, MD
17) Article in International Journal of Pharmaceutical and Life Sciences April 2020AShrikrushna Subhash Unhale Anuradha College of Pharmacy, Chikhli, and Dist –Buldana (MS) India 443201.

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Review: Solid Waste Management At Kolhar

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Abstract: Solid waste is the useless, unwanted and discarded material resulting from day to day activities in the community. Solid waste management may be defined as the discipline associated with the control of generation, storage, collection, transfer, processing and disposal of solid waste. The study of solid waste management at Kolhar is Small town .The collect information about collection and of transportation of largely Recovery ,Recycling and Disposal. The Present Review based on the stud Carried out on Solid waste management Practice by kolhar City.

Keywords: solid waste, management, composition.

Introduction

The Review included solid waste consist of kitchen waste, school's -Colleges waste, Municipal waste, Agriculture, hotels and Hospital waste. The amount of this solid waste is increasing day to day with increasing Urbanization and it creates various Environmental Problems. The government has launched a very effective scheme name Sant-Gadge Baba Nagari Swachhata Abhiyan and Swachha Bharat Abhiyan, Review consist of How to waste management at Kolhar and advantages of Environment. Kolhar bk. is large village located in rahata taluka of ahmednagar district , Maharashtra with total 2721 families residing. The kolhar bk village has population of 14057 of which 7174 are male while 6883 are females as per population census 2011, Kolhar bk.

Sources of Solid waste:

- Municipal solid waste
- Hospital solid waste
- Institutional Solid waste
- Agriculture solid waste

1) Municipal solid waste:

The Municipal Waste is collected from Complexes, Colonies, Various Shops and Road. There is Solid waste like dust, leafy Matters, Waste Papers, empty bottles ,Plastic (Bottles ,Polythene) food waste other material. The dead Animal are those that die naturally or accidentally killed on road .These Animals are handle with the help of special type of Equipment and dispose them. The Waste from Datt Nagar, Lakshmibai kunkulol Sankul Kolhar Bhagavatipur , Bhagavati Mata Temple Area ,Market Yard collected by Ghanta Gadi .

2) Hospital solid waste:

Hospital Waste Management means the management of waste produced by hospitals using such techniques that will help to check the spread of diseases through. We visit several hospital Shree Sai Children Hospital, Nav-Jivan Hospital, Mahamine hospital, Gurukrupa hospital and discuses with them various Solid Waste Management practices .There is various type of waste like Infections ,Noninfectious, Hazardous, Radioactive, Raw syringe ,Injection, Biodegradable Material Needle .These waste differentiate in various bag Green ,Yellow, red Bags. yellow bag Used for non-biodegradable material. Red bag used for the Hazardous material. Green bag used for biodegradable Material.

3) Institutional Solid waste-

At the Kolhar there are some Institution Arts ,science and commerce college , New English school kolhar , Pravara high school ,Bhagavati mata vidya mandir .Institutional). solid waste. consist of Paper, Plastic's, glasse wood, Food matin. matral etc The generated from educational administrative Public building 3 such as school colleges, offices. Prison odd. Market Hotels, all Pump Petrol Pump clothes shops.

4)Agriculture solid waste:

There is large agricultural land area at kolhar .Most of people doing Farming .Agriculture waste like Spoiled Food Grain ,Green Waste cow dung, Vegetable waste, Sugar cane leaves trash (pacharat) etc are recycle. Using Bio- degradable waste ,cow dung ,vegetable waste Farmer prepared Biogas and Organic Fertilizer agriculture.

The activities associated with the management of municipal solid waste from the point of generation to final disposal can be grouped into the six functional elements.

- Waste generation
- Storage
- Collection
- Transportation
- Segregation & Processing
- Disposal

Municipal solid waste (MSW) also called Urban Solid Waste, and is a waste type that includes predominantly household waste (domestic waste) with sometimes the addition of commercial wastes, construction and demolition debris, sanitation residue, and waste from streets collected by a municipality within a given area. They are in either solid or semisolid form 2 and generally exclude industrial hazardous wastes. MSW can be broadly categorized into five broad categories as-

Biodegradable waste: food and kitchen waste, green waste (vegetables, flowers, leaves, fruits), paper (can also be recycled).

Recyclable material: paper, glass, bottles, cans, metals, certain plastics, etc

Inert waste: construction and demolition waste, dirt, rocks, debris.

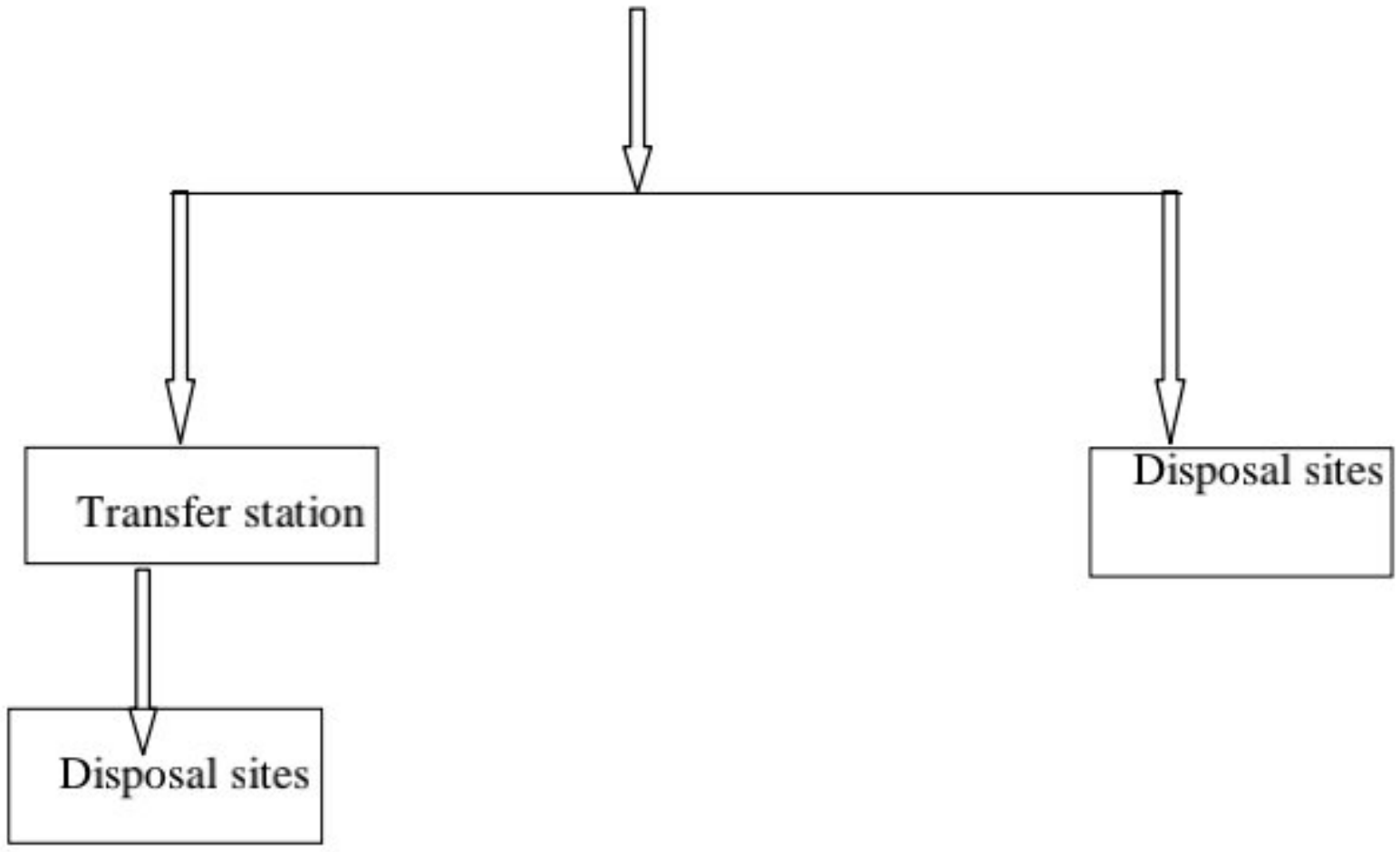
Composite wastes: waste clothing, Tetra Packs, waste plastics such as toys.

Domestic hazardous waste (also called "household hazardous waste") & toxic waste: medication, e-waste, paints, chemicals, light bulbs, fluorescent tubes, spray cans, fertilizer and pesticide containers, batteries, shoe polish.

Source	Typical waste generators	Solid waste contents
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard wastes, wood, glass, metals, ashes, special wastes (e.g., bulky items, consumer electronics, batteries, oil, tires), and household hazardous wastes.
Municipal services	Street cleaning, landscaping, parks, beaches, other recreational areas, water and wastewater treatment plants.	Street sweepings; landscape and tree trimmings; general wastes from parks, beaches, and other recreational areas; sludge.
Institutional	Schools, hospitals, prisons, government centers.	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes.
Commercial	Stores, hotels, restaurants, markets, office buildings, etc.	Paper, cardboard, plastics, wood, food wastes, glass, metals, special wastes, hazardous wastes.
Agriculture	Crops, orchards, vineyards, dairies,	Spoiled food wastes,

	feedlots, farms.	agricultural wastes, hazardous wastes (e.g., pesticides)

2. Collection Of Solid Waste



Flow chart showing collection of solid waste in fig.1

As a part of decentralization entire city is divided into five zones for the collection of solid waste as follows.

- Weakly Market
- Sanjay Gandhi school, Banger Nagar
- Girls hostel, Near postal ground
- Bus stop
- Bhagwati square

There are many verities of municipal solid waste such as food waste, rubbish,

commercial waste, institutional waste, street sweeping waste, industrial waste, construction waste and sanitation waste. It contains recyclable (paper, plastic, glass and metal etc.), toxic substances (paints, pesticides, used batteries, medicines etc.) Compostable organic matter (fruit and vegetable peels, food waste), soiled waste (sanitary napkins, etc.)

Transportation of Municipal Solid Wastes –

Vehicles used for transportation of wastes shall be covered. Waste should not be visible to public, nor exposed to open environment preventing their scattering. The following criteria shall be met, namely:-

(i) The storage facilities set up by municipal authorities shall be daily attended for clearing of wastes. The bins or containers wherever placed shall be cleaned before they start overflowing;

(ii) (ii) Transportation vehicles shall be so designed that multiple handling of wastes, prior to final disposal, is avoided.

Segregation of Municipal Solid Wastes-

In order to encourage the citizens, municipal authority shall organize awareness programme for segregation of wastes and shall promote recycling or reuse of segregated materials. The municipal authority shall undertake phased programmed to ensure community participation in waste segregation. For this purpose, regular meetings at quarterly intervals shall be arranged by the municipal authorities with representatives of local resident welfare associations and non-governmental organizations.

Classification of waste

Biodegradable Waste	Non- Biodegradable Wastes	
Organic Waste	**Recyclable Waste**	**Others (Inorganic /Hazardous Waste)**
• Used Tea Leaves/ powder	Rubber	• Some medicines
• Egg Shells	• Shampoo bottles	• Paints
• Kitchen waste	• Glass	• Fluorescent tubes
• Fruit peels	• Wires	• Spray cans
• Meat	• Metal/ Metal objects	• Fertilizers and pesticide containers
• Bones	• Plastic •	• Batteries
•Flowers	• Rags	• Shoe polish
• House dust after cleaning • Leather	• Leather	
• Fruit peels	• Rexine	
• Garden Waste		
Paper Recyclable		

Storage of Municipal Solid Wastes-

1 Municipal authorities shall establish and maintain storage facilities in such a manner as they do not create unhygienic and unsanitary conditions around it. Following criteria shall be taken into account while establishing and maintaining storage facilities, namely:-

2. Storage facilities shall be created and established by taking into account quantities of waste generation in a given area and the population densities. A storage facility shall be so placed that it is accessible to users.

3. Storage facilities to be set up by municipal authorities or any other agency shall be so designated that wastes stored are not exposed to open atmosphere and shall be aesthetically acceptable and user-friendly;

4. Storage facilities or 'bins' shall have 'easy to operate' design for handling, transfer and transportation of waste. Bins for storage of bio-degradable wastes shall be painted green, those for storage of recyclable wastes shall be painted white and those for storage of other wastes shall be painted black;
5. Manual handling of waste shall be prohibited. If unavoidable due to constraints, manual handling shall be carried out under proper precaution with due care for safety of workers.

Material and method

To obtain the basic data on solid waste, information regarding waste generation and its quantity and disposal management is essential. Hence, in the present work, manual survey was carried out as waste generation depends upon topography, seasons, status and habits of population of the area, viz., residential, commercial, market, etc. After completion of the survey, monthly grab samples of 2-kg size were collected during 2005 and 2006 from nine selected sites in different wards/zones of the city (Fig. 1). Similarly, a composite sample was also collected from the waste disposal site of the town.

The collected samples from different sites were mixed together in the laboratory and were seg- regated manually (Sivapalan et al. 2002) for organic (paper, leaves, market waste, wooden matter, kitchen waste, slaughter house waste, cloths, gunny bags, etc.) and inorganic (rocks, sand and bricks, plastic, metal, bones, rubber and leather, glass, etc.) content and weighted sepa- rately which is presented in Table 1. The organic content was dried, grinded and sieved through a 0.45-mm sieve for analysis of pH, electrical con- ductivity (EC), moisture content (MC), organic
caron (OC), nitrogen (N), phosphorus (P) and potassium (K) with the help of standard methods given by Tondon (2005) and Trivedi and Goel (1984). The results obtained after analysis are presented in Table 2.

Result and discussion

It is observed from Table 1 that the organic con- tent is the main component of the MSW quan- tity which accounts for 61% of the total waste generated in the city. However, inorganic waste accounts for only 39% of total waste.

Table 2 Characteristics of organic solid waste from MSW of Kolhar City

Sr. no.	Parameter	Value
1	pH	7.1
2	EC (mhos)	3.8
3	Moisture content (%)	38.5
4	Organic carbon (%)	40.2
5	Nitrogen (%)	0.73
6	Phosphorus (%)	0.93
7	Potassium (%)	0.35

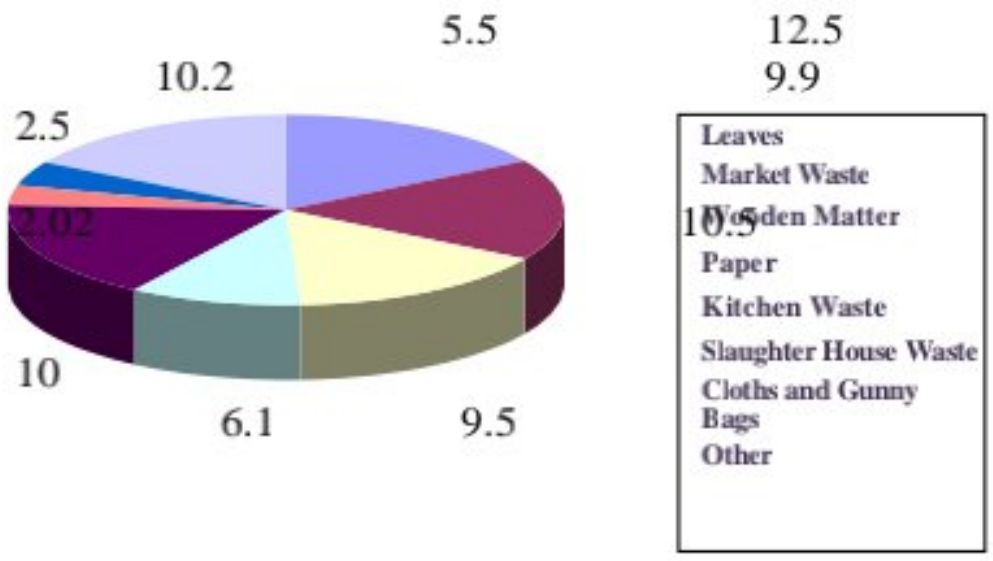


Fig. 2 Composition of organic content in MSW of of Kolhar

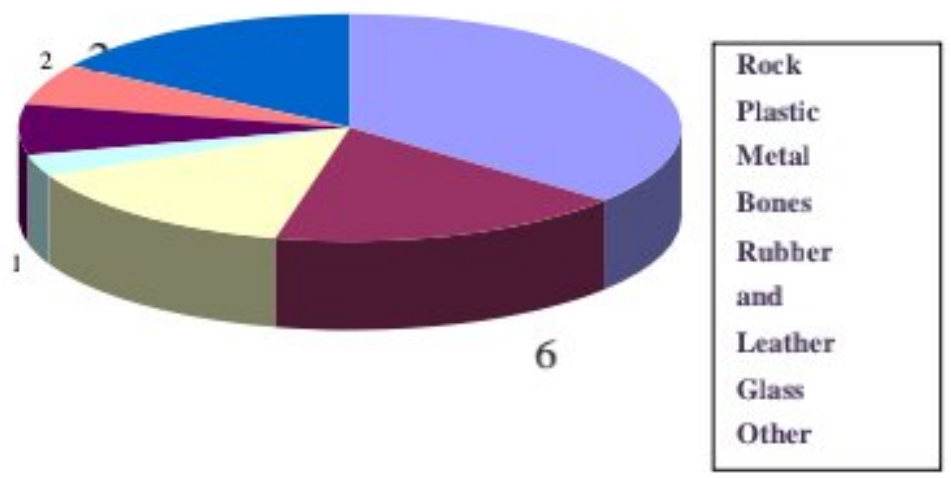


Fig. 3 Composition of inorganic content in MSW

Kolhar city in percent

The organic and inorganic contents from Table 1 were plotted in a pie diagram and shown in Figs. 2 and 3, respectively.

It can be observed from Fig. 2 that a major part of the organic waste is occupied by market waste which accounts for 10.5%, followed by kitchen waste 10%, leaves 9.9%, wooden matter 9.4%, pa- per 6.1%, cloths and gunny bags 2.5%, slaughter house waste 2.02% and other inseparable material accounting for 10% of total waste. These products are the result of daily and weekly market held in the city, different activities from a large domestic sector from the different wards of the city, activ- ities at hotels and restaurants spread throughout the city, sweeping of roads, cutting of trees, papers used for different purposes like packing of food materials and gift materials, etc.

Figure 3 reveals the composition of inorganic waste from MSW. Inorganic waste is contributed by rocks, stones, bricks and sand which accounts for about 12.5% followed by plastic 6%, metal 5%, rubber and leather 2.5%, glass 2%, bones 1% and inseparable material 5.50%. These products are added in MSW by different activities like con-

of moisture in the refuse is mainly contributed by cooked waste material from hotels, restaurants (Sharma and Gupta 2006) and household kitchen waste. The moisture is also contributed by slaugh- ter house waste. The results are some what sim- ilar to that reported by Sivapalan et al. (2002), from the study of Kuala Lumpur city waste. The organic carbon of the dry solid waste is 40.2% which might be contributed by ash and other carbon-containing materials. Nitrogen content of the organic matter is 0.73% which shows that the vegetable matter which is the main source of nitrogen in the city waste is contributed by kitchen waste and market waste. The phosphate content is 0.93%, and potassium content is 0.35%. These values indicate that the organic matter from city waste may stand as a great potential source of nutrients for crops if used as a fertiliser through compostin(Sharholetal. 2007).

3. Disposal Of Solid Waste

There is a site for the municipal solid waste management at village Kolhar situated at 18 km from the Rahata city. Disposal of solid waste is done by the following two methods.

Composting: - It is done by vermin composting of any type of biodegradable wastes such as hotel refuge, biodegradable portion from residence and commercial market, vegetable waste, leaf litter, etc. Size of each vermin composting rack is 6.12 m X 1.52 m X 0.6 m made up of steel. It requires two month.

Land filling:-Waste is stored on the top of the hill in 5 acres area. All inorganic material is used for the land filling and dumping.

Disposal methods -Improper and unscientific techniques adopted for MSW disposal are economically non - viable and socially unacceptable, due to this selection of proper disposal method is necessary. Quantity and characteristics of the MSW are two major factors, which are to be considered as the basis for the design of efficient, cost effective and environmentally compatible disposal method. One can choose the appropriate disposal method which is generally categorized as follows: For large Scale disposal:

Open dumps-

The cheapest and the oldest easy method of MSW disposal is 'open dumping' where the waste is dumped in low - lying areas on the city outskirts and leveled by bull - dozers from time to time. Open dumping is not a scientific way of waste disposal. Open dumps refer an uncovered site used for disposal of waste without environmental controls. The waste is untreated, uncovered, and not segregated. In spite of its simplicity in execution, the financial involvement for this traditional method of waste management has been quite high particularly for the big metropolis. Uncontrolled, open dumps are not a sound practice. Open dumps are exposed to flies and rodents. It also generates foul smell and unsightly appearance. Loose waste is dispersed by the action of wind. Drainage from dumps contributes to pollution of surface and ground water and also the rainwater run-off from these dumps contaminates nearby land and water thereby spreading disease. A WHO Expert Committee (1967) condemned dumping as "a most unsanitary method that creates public health hazards, a nuisance, and severe pollution of the environment. Dumping should be outlawed and replaced by sound procedures".

Landfill Disposing- of waste in a landfill involves burying the waste, and this remains a common practice in most countries. Landfills are generally located in urban areas where a large amount of waste is generated and has to be dumped in a common place. The equipment required to operate is relatively inexpensive and can be used for other municipal operations as well. Serious threat to community health represented by open dumping or burning is avoided in this method. Landfills are often established in abandoned or unused quarries, mining voids or borrow pits. Unlike an open dump, it is a pit that is dug in the ground. The waste is dumped and the pit is covered at the dumping ground with debris/ soil and spread evenly in layers.

Conclusion

- The collected data shows that the maximum proportion of refuse caused by food and garden wastes, proportion of the reuse caused by food and garden wastes, second highest was paper and the third highest was inert material. Percentage of Plastic carry bags was higher, where glass, ceramic and metals were nearly equal with each other.
- Provision of litter bins at public places shall be made and there will compulsory segregation at all the sources.
- As the disposal site is at 18 km away and smaller vehicle are used for the transportation of solid waste, it would be desirable to set up transfer station to economize the expenditure on the transportation.

  As manual separation plate form of solid waste is there at the disposal site in village Kolhar, it is the most positive way to achieve the recovery and reuse of material such as metal, plastic, glass and rubber etc.It should be done throughout the year. System should

be based on Environmental protection rules (reduce, recycle, reuse and recover)
Public awareness, political will and public participation as essential for the successful implementation of the legal provisions and to have an integrated approach towards sustainable management of municipal solid wastes.

References

[1] Rahata Municipal corporation
[2] Prof.M.R.Gidde, Prof Dr.V.V.Todkar, Prof K.K.Kokate, Indo Italian conference on green and clean environment march 20-21, MAEER's MIT college of Engineering, Pune. Municipal solid waste management in emerging mega cities: A Case Study of Pune City.
[3] Kurian Joseph, perspectives of solid waste management in India, International Symposium on the Technology and Management of the Treatment & Reuse ofThe Municipal Solid Waste, Shanghai, China, 2002
[4] Indris, A., Inane, B., & Hassan, M. N. (2004). Overview of waste disposal and landfills/ dumps in Asian countries. *Journal of Material Cycle and Waste Management, 6*, 104–110.
[5] LaMar, J. J., Daniel, D. E., Abeele, W. V., Ledbetter, J. O., & Hansen, W. R. (1978). Effects from past solid waste disposal practices. Journal of Environmental Health and Perspective, 27, 215–221.

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Physico-Chemical Parameters of Drinking Water Supply Tank in Dhanore Village of Ahmednagar District

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Abstract

In present research physicochemical parameters of drinking water Supply tank in Dhanore region was taluka Rahuri district Ahmednagar was selected. The lake was constructed to supply clean and sustainable water to the village. Sample was collected at certain time interval throughout the year. In this research various physical and chemical changes occurring on the water in the selected area due to changes in climate, temperature was studied in January to December 2020. The parameters link pH, TDS, turbidity, alkalinity, chloride, salinity, phosphate was studied. In this analysis all analyzed parameters are compare to the permissible limit from this we have come to the conclusion that the water of this place does not contain any harmful pollutants which may affect the health of human and animal; therefore, it is suitable for the growth of potable, agricultural, small food processing industries, animal plants.

Keywords: Water supply tank. Monthly Analysis. Physico-chemical Criteria etc.

Introduction

India's self-sufficiency of food grains after the Green Revolution has been a major contributor to India's lack of agriculture, but now global warming, pollution and rainfall are declining due to various reasons. This is it. Their contribution is to quench the thirst of rural, urban, domestic and domesticated wild birds.

But the main source of this water is rain. But used in agriculture. Fertilizers, chemicals, medicines, sewage discharged in urban areas, discharged water in industrial estates. As a result, the natural quality of the water changes. As a result, the water is sometimes drinkable and sometimes unfit for drinking. Due to the use of contaminated water, people and animals are suffering from various diseases. This is very scary. Therefore, the quality of potable water was checked at regular intervals to maintain environmental balance. In this he examined the quality of its physical and chemical processes.

In the present study. The physical and chemical parameters of the pond of the water supply scheme supplying water to Dhanore village have been calculated. This lake is in the village of Dhanore. Rahuri tahsil is centrally located in the scarcity zone of Ahmednagar district in Maharashtra. Geographically, it is lengthy from 190 15' 00" N to 190 34' 00" N latitude and 740 23' 30" E to 740 50' 00" E longitude and is divided into the basins of river Mula and Pravara Its area is ten acres. On its right side, water is supplied from Pravara left canal.

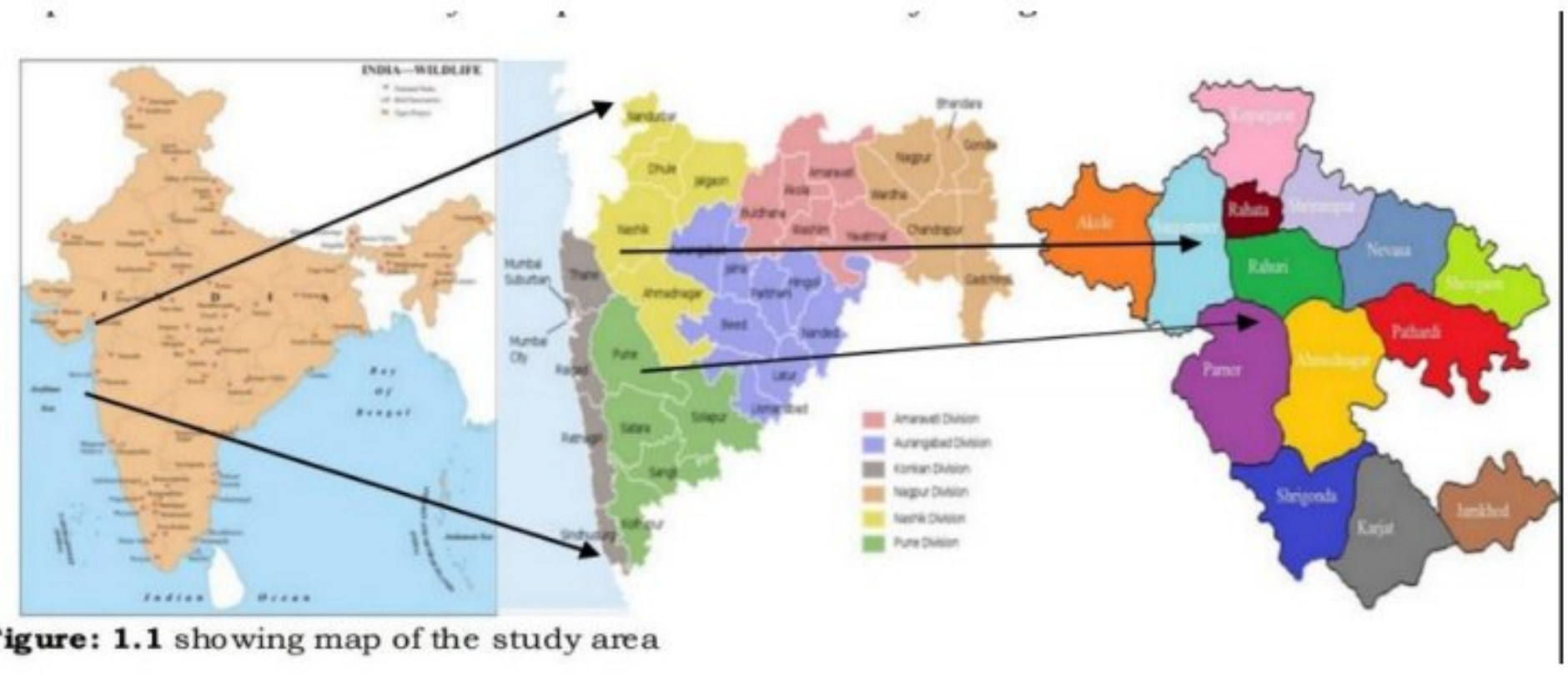


Figure: 1.1 showing map of the study area

Materials and methods.

Water samples from this pond Collected from four different stations every morning regularly collect water samples in a polythene bottle from 10 am to 12 noon on a regular basis for a month brought to the laboratory. It contains a variety of physicochemical parameters, water content, temperature. TDS, Electric Conductivity, DO, TDS, Free CO_2, hardness, salinity, chlorides, phosphate and nitrate were studied .To record the pH at the time of sample collection every morning. Thermometers and pocket digital pH meters were used.

1. **Dissolved Oxygen (DO):**
   ¾ Collect sample in BOD bottle ¾ 2 ml MnSO4+ 2 ml Alkali iodide-azide+close stopper ¾ Mix well + allow the ppt to settle ¾ Add 2 ml concentrated H2SO4 + mix well till ppt dissolves ¾ Take 203 ml .(Correspond to 200 ml) sample in a conical flask+titrate against Sodium thiosulphate (0.025 N) till paleyellow colour + starch + titrate till blue to colourless Calculation ¾ 1 ml of 0.025N Na2S2O3 = 0.2 mg ofO2 ¾ D.O. in mg/l =(0.2 x 1000) x ml of thiosulphate 200 Results : D.O. mg/
2. **Total Dissolved Solids (TDS):**
   Determination of TDS based on conductivity A. Gravimetric method 1. Principle – The sample is filtered and the filtrate evaporated in a tarred dish on steam bath. The residue after evaporation is dried to constant mass at 103-105°C or 179-181°C
3. **Ammoniacal Nitrogen:**
   By Titration Method 1. Principle – The sample is buffered & distilled and Ammonia absorbed in distillate is titrated with standard Sulphuric acid. The following table values are used for selecting sample volume for distillation. Nesslerization Method 1. Principle- The sample is buffered and distilled. The ammonia in the distillate or in the sample is treated with Nessler's reagent and the colour developed is matched with that of a series of standard ammonia solutions or measured photometrically at 400 to 425 nm
4. **Boron:**
   Azomethine Method 1. Principle Reaction of azomethine-H, which is the condensation product of H- acid (8-aminonaphth-l-ol-3.6-disulfonic acid) and salicylaldehyde, with dissolved forms of borate at a pH of about 6, leads to the formation of a yellow complex that is measured spectrometrically at the absorption maximum in the range of 410 nm to 420 nm.
5. **Chloride:**
   Argentometric method 1. Scope: This method prescribes the determination of chloride. This method is suitable for use in relatively clear waters when 0.15 to 10mg of chloride is present in the portion titrated. 2. Principle: In a neutral or slightly alkaline solution, potassium chromate can indicate the end point of the silver nitrate titration of chloride. Silver chloride is precipitated before red silver chromate is formed.
6. **Magnesium:**
   Gravimetric Method 1. Principle: Diammonium hydrogen phosphate quantitatively precipitates magnesium in ammoniacal solution as magnesium ammonium phosphate. The precipitate isignited and weighed as magnesium pyrophosphate. Below 1 mg/L atomic absorption Spectrophotometric method is desirable..Hardness
7. **Alkalinity:**
   Principle: Alkalinity of water is the capacity of the water to accept protons. It may be defined as the quantitative capacity of an aqueous medium to react with WATER ANALYSIS 2016 105 hydrogen ions to pH 8.3 (phenolphthalein alkalinity) and then to pH 3.7 (total alkalinity or methyl orange alkalinity).
8. **Sulphate:**

Principle - Sulphate ion is titrated in an alcoholic solution under controlled acid conditions with astandard barium chloride solution, using thorin as the indicator.

9. **Total Solid:**
Principle- The sample is evaporated in a weighed dish on a stream-bath and is dried to a constant massin an oven either at 103-105oC or 179-181°C. Total residue is calculated from increase in mass.

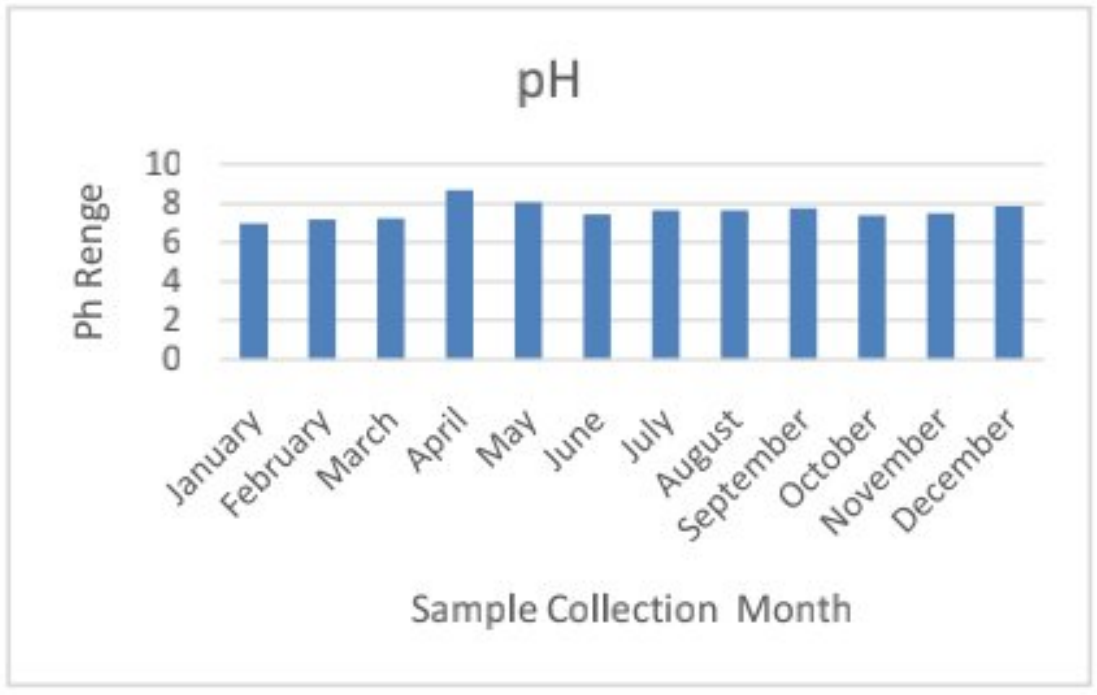
10. **pH:**
Principle – The pH value is determined by measurement of the electromotive force of a cell consisting of an indicator electrode immersed into the test solution and a reference electrod e. Contact between the test solution and the reference electrode is usually achieved by means of a liquid junction which forms part of the reference electrode. The electromotive force is measured with a pH meter i.e. a high impedance voltmeter calibrated in terms of pH.

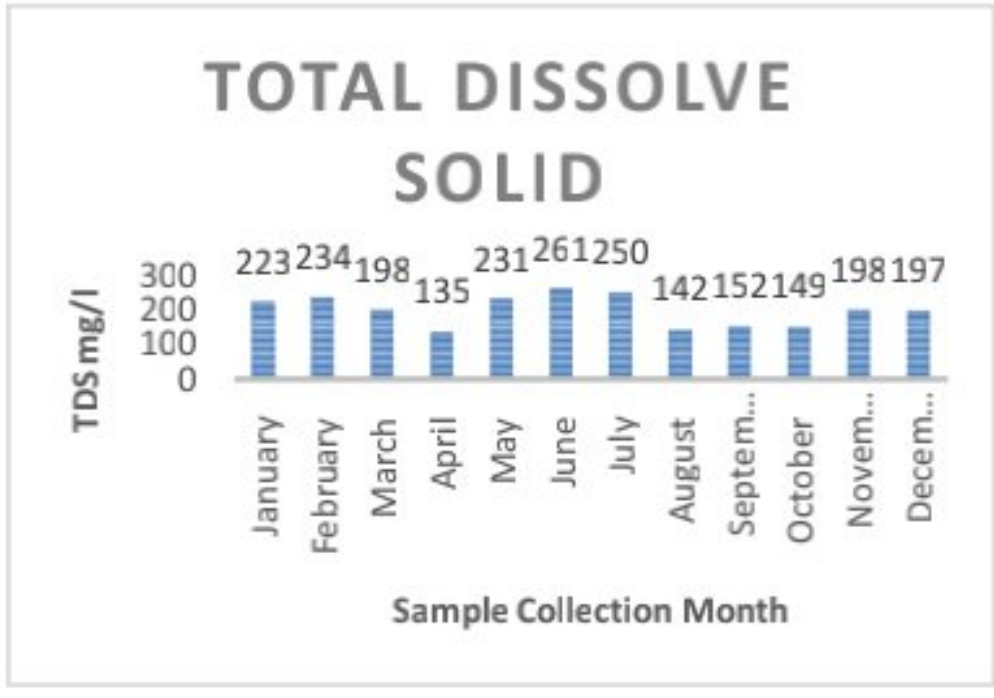
11. **Turbidity**
Principle - It is based on comparison of the intensity of light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. 2. Interferences - Coloured solutes cause lowering of turbidity **TDS**(Trivedi and Goyal, 1986, APHA 1985).

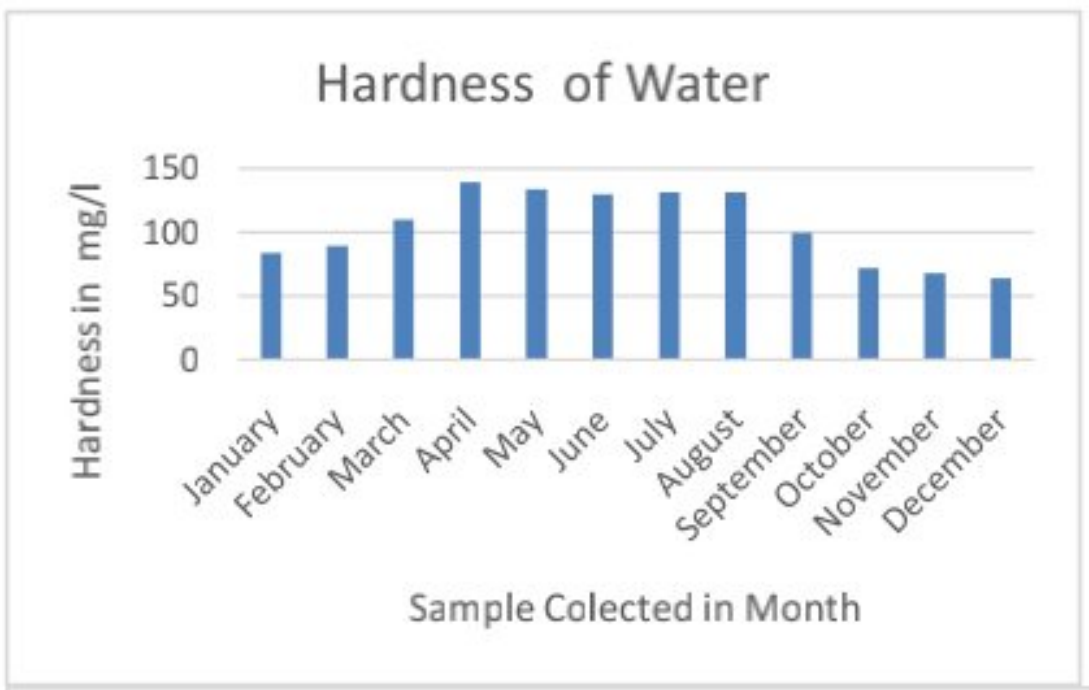
Physicochemical parameters Analysis Table for Dhanore Water Suply Tank.

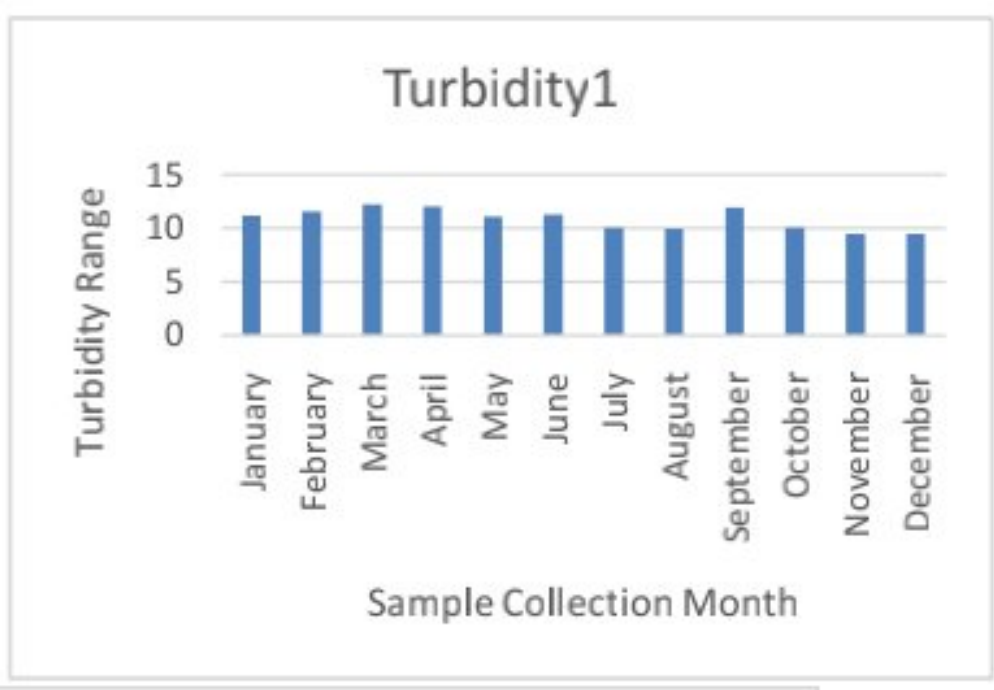
	Sample collection time	**Month**	**Sample Collection Temperature on Spot**	**pH**	**Total Dissolve Solid**	**Turbidity1**
1	10:10 Am	January	22	7.00	223	11.21
2	10:30 Am	February	23.6	7.21	234	11.61
3	11:10 Am	March	27.03	7.23	198	12.20
4	10:23 Am	April	28.10	8.70	135	12.10
5	10: 25 Am	May	27.00	8.10	231	11.13
6	10: 24 Am	June	25.23	7.45	261	11.32
7	10: 30 Am	July	25.00	7.68	250	10.10
8	10: 21 Am	August	24.20	7.65	142	10
9	10: 25 Am	September	23.10	7.75	152	12
10	10: 32 Am	October	23.31	7.42	149	10.10
11	10: 15 Am	November	22.00	7.52	198	9.52
12	10: 20 Am	December	22.21	7.85	197	9.54

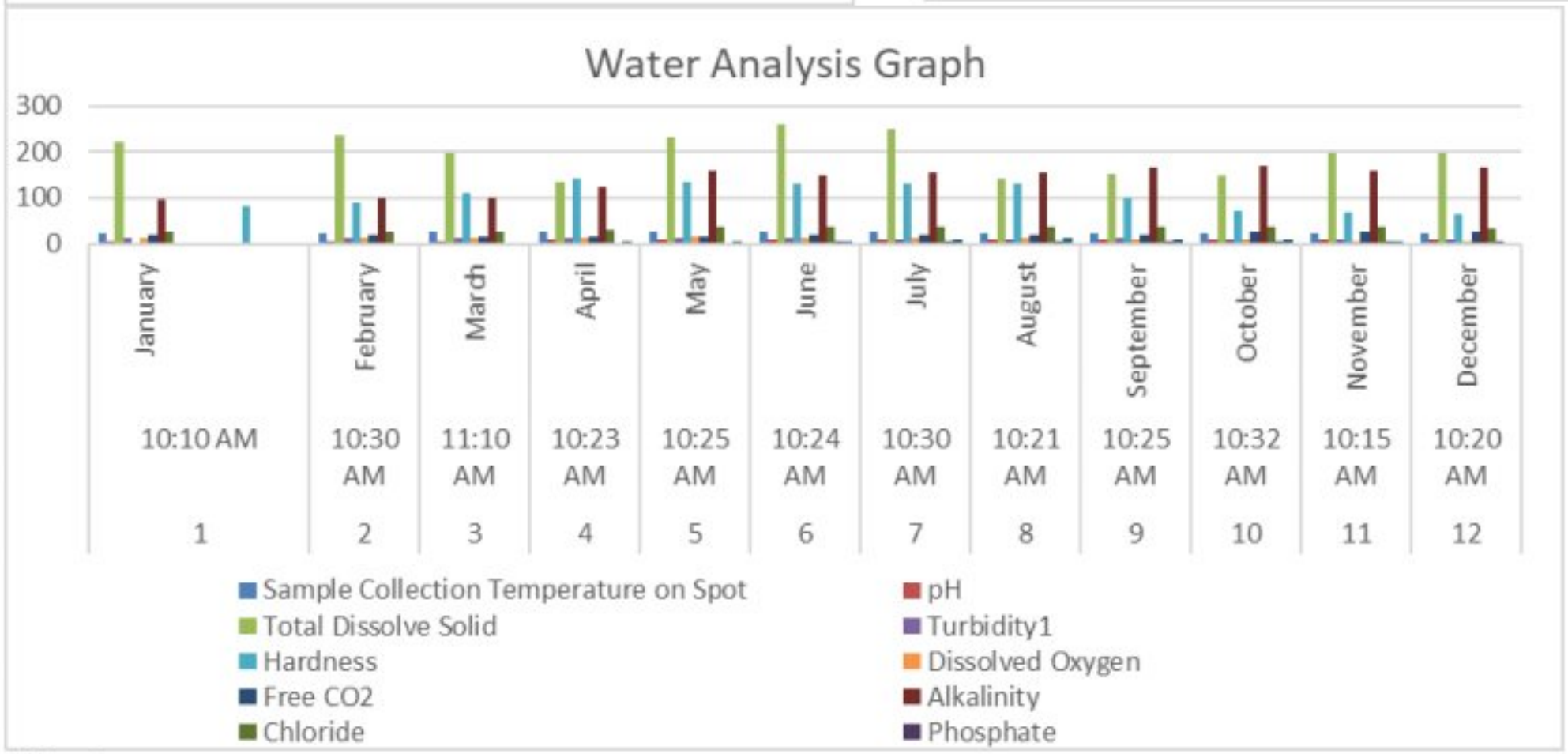
	Sample collection time	**Month**	**Hardness**	**Dissolved Oxygen**	**Free CO_2**	**Alkalinity**	**Chloride**	**Phosphate**
1	10:10 Am	January	84	12.0	18.00	96.6	26.0	1.98
2	10:30 Am	February	89	12.5	18.2	98.0	27.0	2.00
3	11:10 Am	March	110	11.90	17.34	99.65	26.4	2.45
4	10:23 Am	April	140	12.6	17.00	123.0	29.6	2.50
5	10: 25 Am	May	134	15.6	17.00	159	35.5	3.24
6	10: 24 Am	June	130	13.0	19.0	149	36.9	4.52
7	10: 30 Am	July	132	12.6	19.6	154	37.21	5.34
8	10: 21 Am	August	132	12.00	19.8	154	36.6	5.51
9	10: 25 Am	September	100	9.8	20.21	165	37.12	5.11
10	10: 32 Am	October	72	8.26	26.00	170	35.6	5.02
11	10: 15 Am	November	68	7.23	26.5	159	35.3	4.21
12	10:20 Am	December	64	7.22	27.3	165	34.6	4.01











Weather:

The water supply pond of your choice and its surroundings falls in the normal rainfed zone. The climate here is based on normal rainy season climate. The temperature here usually rises slowly after the month of March and it rises sharply till the month of May-April is usually the hottest month with the highest temperature rise. Normal leaves come in three climatic seasons in India Season.January February, February, March April, May June, June to July, August September November December. Winter, summer and monsoon are the main seasons in these months. Climate change occurs during this period, so whatever happens, it affects the water quality of the pond. The wind speed from June to October is 2.5 to 3.9 kmph. Per hour It is flowing. It is slowing down in winter. As winter approaches, the climate changes. The climate is clear and the temperature is low during this period, which also has some effect.

Water temperature:

The increased temperature of the water affects the physical chemical parameters. Also the temperature of the study area you have chosen is somewhat hot and mildly cold. The climate here is clean, dry and normal, so its temperature is carefully recorded while collecting water samples throughout the month. It rises to 25 in January and 36 in April. Its physico-chemical parameters are affected.Climate change (Salve and Highware, 2008)

Water surface:

Normally the pH of water should be 7.0 for health
Also the pH is higher in a few months. So in a few months the pH goes down. In the month October Most of the biochemical and chemical reactions The month of October is a mixed month because sometimes it rains and sometimes it rains a lot, so changes in the climate also lead to an increase in pH. The same body of water changes from March to April due to high temperatures. Rising temperatures cause a change in the carbon footprint (Carnth, 1987; Tiwari et al., 2009).

Dissolved oxygen:

Changes up to the value of DO mg / l. High values (.... mg / l) were recorded in May, while low values (..mg/l)were ,recorded in November March-April is the hottest month. Therefore, intense heat raises the water temperature and increases the dissolution of oxygen.

Free carbon dioxide:

Free CO2 detection is from .... mg / l ya value ... mg / l. The maximum value (... mg / lwas reported During the winter period (December) and (... mg / l) In the last days of winter, in the month of February. They were found in small quantities. Free carbon depends on the salinity of the water and the hardness of the water.

Hardness:

Hardness is normal leaf evaporation during high temperature when the temperature is high. Hardness is usually found in the range of 142-70mg.l.In summer (April) lotus value up to 142 mg / l. And in winter (October) ..... at least recorded (Hujre, M.S., 2008).

Alkalinity:

The water solubility of the place you choose should be at least 96 -159 mg lt. This measurement is found.159mg / l in summer season It is found in 96 mg / l in winter season.
This changes as the amount of bicarbonate in the water increases. (Hujre, MS. 2008) It was also found to be less in winter and more in summer.

Chlorides:

These elements grow mainly in summer. These common leaves are found in at least 26-35.5 mg l in the area you choose. 35.5 in summer and 26.0 in winter.(Swarnalatha and Narsingh Rao, 1990)

Phosphate:

The main reason for the growth of phospet is that its source is rain water. The soil material carries many elements from the mountain and accumulates in the pond Therefore, it was found that it increases in the rainy season and decreases in the winter.
In our study 0.69 to 5.51 mg / l. To this extent they were found. 5.51mg / li during the rainy season mainly in August. In winter it is 0.69 mg

Conclusion:

In this analysis all analyzed parameters are compare to the permissible limit from this we have come to the conclusion that the water of this place does not contain any harmful pollutants which may affect the health of human and animal; therefore, it is suitable for the growth of potable, agricultural, small food processing industries, animal plants.During this twelve month period it was noticed during the examination of Physico chemicals. During the months of June to August, there was a great shortage of fresh water. Dust the soil with that water at that time. Crop particles are carried and as a result all pH, TDS, turbidity, alkalinity, chloride, salinity, phosphate parameters change. It also affects the quality of water during the summer and winter periods and therefore affettuoso.

Reference

1. Trivedi, RN Dubey, DP and Bharti, S.L. (2009): Hydro-geochemistry andGroundwater quality in Bihar river basin, Rewa District, Central Prakash, India, Prof. International Council Hydrology and Watershed, JN&T Hyderabad, pp.49-59
2. Hujre, MS (2008): Seasonal differences Physico-chemical parameters in perennial Talsande,tank in Maharashtra. Ecotoxicol .Atmosphere. Monitor. 18 (3): 233-242.
3. Swarnalatha, S and A. Narasingrao (1998):Environmental Study of Banjara Lake References to water pollution. J. Envi. Biol. 19 (2): 179-186. 13. Arvind Kumar, (1995):

4. APHA (1985): Standard methods for Water and Sewage Test, 20th Edition, American Public Health Association,Washington d. C.
5. Gurunathan, A. Shanmugam, CR, (2006):Practice rights and their relevance Select Cases in Modern Tank Management:Tamil Nadu, Paper prepared for the workshop Title 'Water, Law and Commons' Held in Delhi from 8 to 10 December 2006 in accordance with International Environmental Law Research Center (ILERC).
6. Karantha, KR (1987): Groundwater AssessmentDevelopment and Management Tata McGraw Hill Publishing Company Ltd., New Delhi, 725 p.
7. Palanisamy, K. And r. Balasubramanian(1998): General property and private Prosperity:Tank vs. Tamil Nadu. Private wells, Indian Agricultural Economics Journal, Volume 53,No. 4, October - December.
8. Salve, V. B. And Hiware c. J. (2008): Study Wanparkalpa Reservoir Water Quality, Near Parli Vaijnath, District Beed. Marathwada Region, J. Aqua. Biol., 21 (2): 113-117. Some Immune aspects of freshwater Santhal's tropical wetlands. Pargana (Bihar)India, J. NV. Polling 2 (3): 137-141
9. Trivedi, R. K. And Goyal p. K. (1986): Chemical And biological methods for water pollution Studies, Environmental Publications, Karad, Maharashtra.10) Karantha, KR (1987): Groundwater AssessmentDevelopment and Management Tata McGraw Hill Publishing Company Ltd., New Delhi, 725 p.
10. Basavaraj Sampi ,S.M. Hiremath ,K.N. Chanrashearappa, Anil N. Patel, E.T. Puttiah (2011) Analysis of Water Quality Using Physico-chemical Parameter Hosahalli Tank ink in Shimoga District, Karnataka,India Globel Journal of Science Frontier Research

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Colorimetric Method for Determination of Cobalt inIndustrial Waste Water Samples

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Abstract:
A colorimetric method which can be used to determine concentrations of developed cobalt in industrial waste water sample. The different method is applicable for the detection of cobalt at concentrations in environmental samples.Cobalt and few heavy metals present in industrial wastewater. These metal ions can have different effects on biological cycle of living organisms. This method involves the measurement of the absorbance of the coloured complex form at 520 nm. In this work, we investigated the possibility to determine calorimetrically cobalt ions.
Keywords: Colorimetric detection Cobalt ion,

Introduction

The different pollutants present in industrial waste water. The nature of wastewater plays important role in to decide the which method is useful for analysis. The pollutants are classified as organic, inorganic, biological and toxic present in wastewater. Other types of pollutants include differentgrainy materials, oil and grease etc. The most common structure of industrial wastewater includes physical, chemical and biological treatment. The removal of organic matter from the wastewater is major treatment. Different methods are studied by investigators such as affecting parameters, kinetics, isotherms and mechanism. The removal of heavy metal can be carried out by using membrane separation, biological methods and adsorption by different adsorbents.The presence of metals in industrialwastewater can cause different acute and chronic diseases. Cobalt is such metal used in industries such as nuclear, medicine, enamels and semiconductors, grinding wheels, painting on glass and porcelain, hygrometers and electroplating. Cobalt can have different adverse effects on health such as asthma, heart damage, heart failure, damage to the thyroid and liver. The determination of cobalt from industrial wastewater can be carried out by differentphysical, chemical and biological methods.

Experimental

The calorimetrically detection of heavy metal ions was performed at room temperature. The stock solutions of waste water sample for heavy metal ions were prepared with metal chloride in deionized water. A volume of solution 0.1 mL of 4 M APTES was added to 3 mL of different concentrations 0.1ppm, 1ppm, 10ppm, 20ppm, 50, and 100 ppmof Co^{2+}, Pb^{2+}, Cu^{2+}, Cr^{2+}, and Hg^{2+} ions. Colour change was analysed with UV-spectra (UV-18000, Shimadzu). Performed batch experiments to study effect of these parameters on adsorption and the optimum parameters for cobalt removal were pH-4, initial concentration of metal ions. They observed that low adsorbent dose, high pH and high initial concentration of wastewater.

Conclusion

The detection of Cobalt from wastewater sample can be carried out by using adsorbents. The research has been reported on use of industrial waste water for detection of cobalt. The main objective of adsorption was study on affecting parameters, kinetics and isotherm. The isotherm and kinetics depend on nature of adsorbent. The increase in initial concentration, adsorbent dose and pH favours to remove cobalt. Methods such as precipitation, ion exchange and electrodialysis were also found to be useful for cobalt removal.

References

1. Sunil Jayant Kulkarni, AjaygiriKamalgiri Goswami, "Characterization,Treatment and Disposal of Sludge: A Review", International Journal for Research in Applied Science & Engineering Technology, 2014, 2(2), 516-517.
2. Sunil J. Kulkarni, "Removal of Organic Matter from Domestic Waste Water by Adsorption", International Journal of Science, Engineering and Technology Research, 2013, 2(10), 1836-18840.
3. Pallavi Amale, Sunil Kulkarni, Kavita Kulkarni, "A Review on Research for Industrial Wastewater Treatment with Special Emphasis on Distillery Effluent", International Journal of Ethics in Engineering & Management Education, 2014, 1(9),1-4.
4. Sunil J. Kulkarni, "Modeling for Adsorption Columns for Wastewater Treatment: a Review", International Journal of Innovative Research in Engineering & Multidisciplinary Physical Sciences, 2014, 2(2), 7-11. W. Gerhartz, Ullmann's Encyclopedia of Industrial Chemistry, (VCH Publishers, New York,

5. D. Coutsouradis and L. Habraken, Cobalt., 4,3-27 (1959).
6. T.H. Jeffers, J. of Metals., 37,47-50 (1985).
7. T.H. Jeffers, K.S. Gritton, P.G. Bennett and D.C. Seidel, Nuclear and Chemical Waste Management., 8,374 (1988).
8.J.B. McKinley in Catalysis (P.H. Emmett, Ed, Chapman and Hall Ltd, London, 1957). V, pp. 405-423.
9.S.W. Weller and G.A. Mills in Advances in Catalysis (W.G. Frankenberg, V.I. Komarewsky eds, Academic Press, New York, N.Y., 1956) VIII, pp. 163-205.
10. I.Wender. H.W. Sternberg and M. Orchin, in Catalysis (P.H. Emmett, Ed, Chapman and Hall Ltd, London 1957). V, pp. 73-130.F. Fischer, 0. Roelen and W. Feist, Perroleurn. Refin., 22,429-36 (1943). [9] G.H. Unzelman and C.J. Wolf, Petroleum Pmcessing, 12, 70-76 (1957).
11. Albert O. Adegbembo, Philip A. Watson, "Estimated Quantity of Mercury in Amalgam Waste Water Residue Released by Dentists into the Sewerage System in Ontario, Canada", Journal of the Canadian Dental Association, 2004, 70(11), 759-765.
12. Reyad A. Al Dwairi, Aiman E. AlRawajfeh, "Removal Of Cobalt And Nickel From Wastewater By Using Jordan Low-Cost Zeolite And Bentonite", Journal of the University of Chemical Technology and Metallurgy, 2012, 47(1), 69-76.
13. Jaber Salehzadeh, "Removal of Heavy Metals Pb2+, Cu2+, Zn2+, Cd2+, Ni2+, Co2+ and Fe3+ from Aqueous Solutions by using Xanthium Pensylvanicum", Leonardo Journal of Sciences, 2013, 23, 97-104.
14. V.H. Waghmare, U.E. Chaudhari, "Kinetics and Thermodynamics of Co(II) Adsorption on Moringa Olifera Bark From Aqueous Solutions", International Journal of Chemical and Physical Science, 2015, 4(special issue), 255-260.
15. Evans T. Musapatika, Ruella Singh, Krishnie Moodley, Charles Nzila, Maurice S. Onyango3 and Aoyi Ochieng, "Cobalt removal from wastewater using pine sawdust", African Journal of Biotechnology, 2012, 11(39), 9407-9415

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A Review: Milk Adulteration and Its Hazardous Impact on Consumer Health

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Abstract:
Milk is a good nutritious drink and is eaten for drinking as such, as well as by milk products, by a majority of the population worldwide. However, the practice of adulteration of milk is a global concern and a social problem worldwide, especially in developing countries. The adulteration of milk invariably reduces its quality and introduces hazardous substances leading to serious health hazards for consumers. Increased demand, competition and financial gain are predisposing for malpractices, wherein substances such as extraneous water, foreign proteins, whey proteins, melamine and urea, vegetable or animal fat, starch, salt, soap, detergents, skim milk powder, formalin and hydrogen peroxides are commonly used. In this brief review, the adulteration of milk and their health hazards on consumer health are discussed.
Keywords: Milk, Milk safety, milk adulterant, Urea, starch, Common Salt, Sugar.

Introduction:

Milk is a compulsory part of the expectant mom's daily diet as well as growing infants. Due to its unique nutritional value and its important role in human and animal health, milk is very important. In its most easily attackable shape, it has all the substances needed by species. Milk is recommended for young and old people, because of its nutritional value (Reddy et al., 2017).

Milk is the best and cheapest source of nutrition and used by all the age groups in rural as well as in urban areas. It provide appreciable amount of fats and protein and also provides body building vitamins along with furnishing energy giving lactose and many other nutrients, therefore an ideal food for pregnant female and infants. Milk is essential to provide nutrients to maintain health and normal growth of body. Adulterations of milk and dairy products have brought serious risk to human health as well as enormous economic losses to the food industry. Considering the different type of adulterants possibly mixed in milk, such as melamine, urea, antibiotics, sugar/salt and so forth, a rapid, widely available, high-throughput, cost-effective method is needed for detecting each of the components in milk at once (Abdul *et al.*, 2014).

In order to keep milk temporarily fresh, some unethical methods are usually adapted to prevent the financial losses due to the spoilage of milk during its transportation and sale. For instance, the water is added to increase volume of milk, thickening agents like starch, flour, skimmed milk powder, whey powder or other ingredients to prevent the dilution effect and extend the solids content of the milk. Vegetable oil, sugarcane or urea to compensate the fat, carbohydrate or protein content of diluted milk that leads to hazard. Some chemicals such as hydrogen peroxide, carbonates, bicarbonates, antibiotics, caustic soda and even the most lethal chemical formalin to increase the shelf quality of milk, detergents to enhance the cosmetic nature of milk which give foamy appearance and whitening of milk that lead to gastro-intestinal problem.

What Is Adulteration?

Food is the basic necessary for life. At the end of the day, many of us are not sure what we eat. We may be eating some dangerous dye, sawdust, soap stone, industrial starch, and aluminum foil and so many other things that unknown for us. Contaminated foods and drinks are common sources of infection and illness. Hence, we invite diseases rather than good health. Food adulteration takes into account the intentional addition, substitution and abstraction of substances which adversely, affect nature, substances and quality of foods, but also their incidental contamination during the period of growth, harvesting, storage, processing, transport and distribution. Food is adulterate if its quality is lowered or affected by due to addition of substances which are injurious to health or by the removal those substances which are nutritious. So it is defined as, "the act of institutionally debasing the quality of food offered for sale either by the admixture or substituted of inferior's substances or by the removal of some valuable ingredient". Adulterations food including milk is dangerous because it may be poison and can affect health & it could deprive nutrients essential for proper growth and development. Hence, the current review highlights the milk adulterants, their detection and their hazards on health of consumers.

Milk adulteration is achieved to increase its thickness, then adding starch and other reconstituted milk powders to increase its viscosity. Often used to improve the shelf-life of filthy milk ice and other chemicals such as hydrogen peroxide, carbonates, bicarbonates, antibiotics, caustic soda and even the most

deadly chemical formalin. Urea adulterated milk is very dangerous to the children, as it accelerates the puberty process (Bania et al., 2001).

How is processed packaged milk reliable?

Pasteurization & processing of milk, improves the milk quality by killing pathogenic microbes and other micro- organisms that are present in the raw milk. Controlling with the use of reliable & advanced technology, brands provides high quality and great taste of milk. Milk undergoes various type of heat treatment like high temperature-short time (HTST) pasteurization or ultra-high temperature (UHT) treatment.

HTST pasteurization of raw milk is done to improve shelf life up to 48 hours when stored at refrigerated conditions. Ultra- high temperature (UHT) sterilization of raw milk is done to improve shelf life 3 to 6 months at room temperature. In HTST pasteurization process, the milk is heated at 72 degrees Celsius for 15 seconds, immediately after which it is cooled to less than 4 degree Celsius. Such pasteurized milk is then packaged in hygienic containers. On the contrary, The UHT process, milk is heated for a very less time - just about a second or two at a temperature between 135 to 145 degrees Celsius. This is followed by cooling to ambient temperature and then packaged in bottles or packs under sterile condition. With the quality and safety standards and superior taste of its packaged dairy products, we assured on the products. Under current guidelines set in 1954, only milk from cow, sheep, buffalo and goat is considered for the standard not of camel and yak. "There is a need to revisit old standards to ensure people eat and drink quality food," said Pawan Agarwal, CEO, Food Safety and Standards Authority of India, the country's food-safety regulator (FSSAI 2016).

Typical Adulterants and Their Health Problems on Humans

A) Water: Water is the most common adulterant in milk (Barham GS, et.al2014). The major percentage of natural milk contains water (87%), but milk with added water is a serious concern. In one hand it decreases the nutritious value; on the other hand, chemicals are added to compensate the density and colour after dilution with water. Since addition of water is the easiest way and cheap source for adulteration of milk. But if contaminated water and color chemicals are added to milk, it is a serious health concern to the milk consumer.

B) Urea: Add half teaspoon of soybean or arhar powder in a teaspoon of milk in a test tube. Mix up the contents thoroughly by shaking the test tube. After 5 mins, dip a red litmus paper after half a minute, change in color from red to blue indicates the presence of Urea in milk. Health hazards associated are acidity, indigestion, ulcers and cancers. Urea is harmful to heart, liver and kidneys (Trivedi UB, et.al.2009) especially for kidneys as the kidneys have to do more work to remove urea from the body (Kandpal SD S. A.,et.al. 2012).

C) Detergents: To emulsify and dissolve the oil in water, detergents are added that give a frothy solution, the characteristic white colour of milk. They improve milk's cosmetic character. Addition of such chemicals will cause health problem especially related to gastrointestinal and kidneys. Detergent is added to milk to increase the foaming of milk and thus to have thick milk. Shake 5-10 ml of sample with an equal amount of water and lather formation indicates the presence of detergent.

D) Starch: Starch is one such component that is added to increase SNF content in milk. The test to detect starch in milk uses iodine solution, addition of which turns the milk solution to blue black color due to the formation of starch –Iodo complex, in the presence of starch. Tincture of Iodine or Iodine solution is used to detect starch adulteration in milk. Presence of blue color indicates the presence of Starch.

E) Sugar: Generally sugar is mixed in the milk to increase the solids not fat content of milk to increase the lactometer reading of milk, which was already diluted with water. Lactose is the common sugar present in milk. The fat content of the milk is more as compared to the protein content. Sugar like sucrose is added to the milk to increase the carbohydrate content of the milk and used to increase the density of milk.

F) Melamine: Melamine is added to milk and milk powder to increase protein content falsely. It causes renal failure and deaths in extreme cases (Cheng et al., 2010).

G) Neutralizers: In synthetic milk, NaOH is often used to neutralise the acidic effect. In India synthetic milk is a common problem that is prepared by adding urea, caustic soda, refined oil and common detergents. For those suffering from hypertension and heart ailments, caustic soda contains sodium and serves as a slow poison. Caustic soda deprives the body of the use of lysine, an essential amino acid in milk which grows babies need. Such artificial milk is unsafe to all, but harms pregnant women more (Bhatt et al., 2008).

H) Chlorine: It is added to compensate the density of the diluted milk after addition of water. Chlorinated milk can cause clogging in arteries and develop heart problem (JG., et.al 2000). Chloride in the milk disturbs the acid base balance in the body and also blood of pH.

I) Food colours: Often several food colouring agents are introduced to enhance appearance and have dangerous health effects.

J) Milk powder: Milk powder is used as adulterant is added in fresh milk. This is done for economic advantage when a country has milk powder in excess or subsidy is provided for dried powder milk (Guan RF, et.al. 2005).

K) Preservatives: Micro-organism production spoils the milk and spoiled milk isn't good for health. The milk can be protected for a long time by boric acid, formalin, sodium carbonate (Na2CO3), sodium bicarbonate (NaHCO3), salicylic acid, benzoic acid , sodium azides and toxic effects that can lead to death. It induces stomach pain, diarrhoea, vomiting and other symptoms associated with poisoning.

Detection of Milk Adulteration: Various milk adulterants and the method used to detect those adulterants are presented.

Table No. 1: Detection of different consumable adulterants in milk

Sr.no.	Adulterant	Procedure	Observation
1.	Sugar	Take a taste of 10 ml of milk in a test tube. Add just 5 ml of conc. HCl and resorcinol at 0.1 g. Place the test tube in a bath of water for 5 minutes.	A red colour appearance suggests that added sugar is present.
2.	Starch	Test 3 ml of milk in a test tube. Cool it to room temperature after stirring thoroughly. Add 1 percent iodine solution with 2 to 3 drops.	A blue colour appearance suggests the presence of starch.
3.	Detergents	Take 2 mL of milk sample into a 10 mL test tube. Add 0.5 ml of Methylene blue dye solution and 1 ml chloroform and centrifuge at about 1100 rpm for 3 min.	More intense blue color in lower layer indicates presence of detergent in milk while more intense blue color in upper layer indicates absence of detergent in milk.
4.	Water	The presence of water can be by putting a drop of milk on a polished slanting surface.	The drop of pure milk flow slowly leaving a white trail behind it, whereas milk adulterated water will flow immediately without leaving a white trail.
5.	Glucose	Take a taste of 1 ml of milk in a test tube. Apply 1 ml of Barford 's updated reagent. Heat the mixture in a bath of boiling water for precisely 3 minutes. Refrigerate easily under tap water. Shake well and apply 1ml of phospomolybdic acid.	The sudden presence of a deep blue colour suggests that glucose is present.
6.	Skim milk powder	Add nitric acid drop by drop in to the test milk sample.	The development of orange colour, it indicates the milk is adulterated with skim milk powder. Samples without skim milk powder shows yellowcolor.
7.	Neutralizers	Take 5 ml of milk in a test tube and add 5 ml alcohol followed by 4-5 drops of rosalic acid	If the colour of milk changes to pinkish red, then sodium carbonate /bicarbonates are presents.
8.	Common salt	Take a sample of 5 ml of milk into a test tube. Add 1 ml solution of 0.1 N silver nitrate. Mix the contents thoroughly and apply 10 % potassium chromate solution of 0.5 ml	The yellow colour appearance suggests the presence of added salts, while the brick red colour shows the milk free from added salt.

Conclusion:

On the basis of this review, we can conclude that, the milk adulteration is becoming serious problem for public health concern. Although financial profit is considered to be one of the major reasons for milk adulteration, inadequate supply for the increasing population all over the world has paved the ground for this as well. Although maximum percentage of milk delivered to the consumers is not as per FSSAI standards. Consumption of adulterated milk may lead to serious human health issues due to adverse effects of chemicals. Hence it is important to have an efficient and reliable quality control system like HACCP that will regularly monitor, combined efforts from scientific communities and the regulatory authorities. The human and technology interface, awareness and access to information can play vital role in eradication of the milk adulteration. This review paper offers a summary of the various elements used in the adulteration of milk, the adulteration technique, and an in-depth analysis of the electrical methods adopted for the adulteration of milk. The review paper is intended to help researchers get an overall understanding of the adulteration of milk and its methods of detection.

References

1. Reddy, D. M., Venkatesh, K., & Reddy, C. V. S. (2017). Adulteration of milk and its detection: a review. *International Journal of Chemical Studies*, *5*(4), 613-617.
2. Abdul Aziz Soomro, Muhammad Khaskheli, Muhammad Awais Memon. Study on adulteration and composition of milk sold at badin. International Journal of Research in Applied, Natural and Social Sciences. 2014; 2(9):57-70.
3. Bania, J., Ugorski, M., Polanowski, A., & Adamczyk, E. (2001). Application of polymerase chain reaction for detection of goats' milk adulteration by milk of cow. *Journal of Dairy Research*, *68*(2), 333-336.
4. http://www.fssai.gov.in Food safety standards authority India (FSSAI) 2016
5. Barham GS, K. M. (2014). Detection and Extent of Extraneous Water and Adulteration in Milk Consumed at Hyderabad, Pakistan. Food Nutr Sci , . 2: 47-52.
6. Trivedi UB, L. D. (2009). Potentiometric biosensor for urea determination in milk. . Sens Actuators B Chem , 140: 260.
7. Kandpal SD, S. A. (ed.al.2012). Estimation of quality of raw milk (open & branded) by milk adulteration testing kit. Indian J Community Health , 24; 188-192.
8. Cheng Y, Dong Y, Wu J, Yang X, Bai H, Zheng H *et al*. Screening melamine adulterant in milk powder with laser Raman spectrometry. J Food Composit Anal. 2010; 23(2):199-202.
9. Bhatt, S. R., Singh, A., & Bhatt, S. M. (2008). Assessment of synthetic milk exposure to children of selected population in Uttar Pradesh, India. Indian Journal of Research, 7, 22-34.
10. JG., H. (et.al 2000). The Negative Health Effects of Chlorine. . The Journal of Orthomolecular Medicine. , 224-248.
11. Guan RF, L. D. (et.al. 2005). Use of fluorometry for determination of skim milk powder adulteration in fresh milk. . Journal of Zhejiang University Science. , 6(11):1101-1106.
12. (Ed.), D. G. (et.al.2005.). Manual of Methods of Analysis of Foods: Milk and Milk Products. Ministry of Health and Family Welfare, Government of India.

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Protection of Carbosulfan Induced Changes in the Ascorbic Acid Content of Freshwater Bivalve, *Lamellidensmarginalis* by L-Ascorbic Acid

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Abstract: *Lamellidensmarginalis*, freshwater bivalves, were exposed to chronic dose of carbosulfan with and without ascorbic acid. The amount of ascorbic acid in the gills, gonads, digestive glands, mantle, and whole-body mass was calculated. In carbosulfanexposed bivalves, the content of ascorbic acid was found to be much lower than in control bivalves. Pesticide plus ascorbic acid exposed groups had higher levels of ascorbic acid in selected tissues than pesticide exposed groups. Bivalves that had been pre-exposed to pesticide recovered quickly and had higher ascorbic acid levels than those that were allowed to cure naturally.
Key Words: Carbosulfan,*Lamellidensmarginalis*, ascorbic acid, chronic exposure.

Introduction:

The use of chemicals of high biological activity been increased for pest control. Pesticides have benefited humanity much by raising food production and decreasing disease vectors in humans and animals. At the same time, the usage of these pesticides has the potential to harm health of aquatic species.Because of their toxicity, persistence, and tendency to accumulate in organisms, pesticides are a major cause of concern for the aquatic environment (Olea and Fernandez, 2007; Joseph and Raj, 2010). Many pesticides are known oxidative stress inducers because they directly produce reactive oxygen species (ROS) and obstruct the natural antioxidants or oxygen free radical scavenging enzyme system (Geter et al., 2008; El-Gendy et al., 2010). The ROS have a strong reactivity and can potentially interact with all other cellular components (lipids, proteins, DNA) and disable them (Manduzio*et al*., 2005; Gwozdzinski*et al*., 2010). To counteract oxidative damage, all aerobic organisms have a network of antioxidants and enzymes that minimize the effects of ROS. The creation and elimination of oxygen radicals coexist in a weak balance. When this balance shifts in favour of the ROS, oxidative stress occurs. By catalysing the generation of reactive oxygen species (ROS), xenobiotics may be able to affect this balance.ROS create new radical species thus, causing oxidations in chain. Such an effect may be at cellular or molecular level but ultimately it would lead to physiological, pathological and biochemical disorders that may prove fatal to the organism (Jain and Kulshrstha, 2000). The present study investigates the propensity of carbosulfan induced variation in ascorbic acid level and its possible mitigation by vitamin C in a convenient model, the fresh water bivalve, *Lamellidensmarginalis*after chronic exposure. On these model animals, several basic processes of pesticide mode of action can be examined, which can be applied to other higher species. Vital organs like gills, gonads, digestive glands, mantleand whole-body mass are used to determine the changes in ascorbic acidcontent on exposure to carbosulfan and its subsequent recovery in presence of ascorbic acid.

The water-soluble vitamin L-ascorbic acid ($C_6H_8O_6$) is essential for the production of collagen, carnitine, and neurotransmitters. Antioxidant, anti-atherogenic, anti-carcinogenic, immunomodulator, and cold prevention are just a few of the health benefits of ascorbic acid (Naidu, 2003). Ascorbic acid is involved in the creation of collagen and bone, as well as wound healing (Gould, 1963). According to Chinoy and Seethalakshmi (1977), ascorbic acid plays an important function in steroidogenesis in molluscs.Free radical scavengers like glutathione, ascorbic acid, and -tocopherol, as well as antioxidant enzymes, can help to reduce ROS toxicity (Gwozdzinski et al., 2010). These antioxidant mechanisms allow chain reactions to be halted and free radicals to be destroyed. The recovery of ascorbic acid contents by ascorbic acid protects the freshwater bivalve *Lamellidensmarginalis* from carbosulfan toxicity.Many researchers had studied the effect of L-ascorbic acid supplementation on toxicant induced alterations in biochemical constituents of aquatic animals (Chinoy*et al.,* 1995; Mahajan and Zambare, 2006; Mahananada*et al.,* 2010; Kamble et al., 2011; Deshmukh, 2012: Waykar and Pulate, 2012)

Materials and Methods:

Medium sized, healthy, fresh water bivalve, *Lamellidensmarginalis*were collected fromGirna dam, 48 km away from ChalisgaonDist. Jalgaon (M.S.). Animals were brought into the lab and acclimatised to dechlorinated tap water for a week. For the experiment, medium-sized animals were chosen.

Experimental design:

Set – I

For experimental studies the animals were divided into three groups–

a) Group 'A' was maintained as control.
b) Group 'B' animals were exposed to chronic dose of carbosulfan (0.5564 ppm, $LC_{50/10}$ of 96 hours) upto 21 days.
c) Group 'C' animals were exposed to chronic dose of carbosulfan (0.5564 ppm, $LC_{50/10}$ of 96 hours) along with 50 mg/l of L-ascorbic acid.

Experimental design for recovery studies:

Set – II

Group 'B' animals from set-I after 21 days exposure to carbosulfan were divided into two groups for recovery studies.

Animals pre-exposed to chronic dose of carbosulfan (0.5564 ppm) were allowed to self-cure in normal fresh water upto 21 days.

Animals pre-exposed to chronic dose of carbosulfan (0.5564 ppm) were allowed to cure in 50 mg/l of L-ascorbic acid added fresh water upto 21 days.

Freshwater algae were provided to the animals during the trial. Animals from sets I and II were dissected and tissues such as digestive glands, gills, gonads, and mantle were separated and complete body mass was dried at 80^0 C in an oven until constant weights were achieved and blended into dry powder after every 7th, 14th, and 21st days interval.These powders were used for the estimation of ascorbic acid contents.Ascorbic acid estimation was carried out by the method of Roe (1967)by using hydrazine reagent.

Table No. 1. Total ascorbic acid content in different soft body tissues of *Lamellidensmarginalis*after chronic exposure to carbosulfan without and with ascorbic acid.

Sr. No.	Tissue	Control (A)			Carbosulfan (B)			Carbosulfan + A.A. (50 mg/l) (C)		
		7 days	14 days	21 days	7 days	14 days	21 days	7 days	14 days	21 days
	Mantle	0.9245 ±1.84	0.9228 ±1.28	0.9180 ±1.52	0.6675** ±0.89 (-27.80)	0.6327* ±1.15 (-31.44)	0.5042** ±1.27 (-45.08)	0.7289** ±1.47 (-21.16)	0.6735* ±0.94 (-27.01)	0.5916** ±1.55 (-35.56)
	Gills	1.1686 ±1.65	1.1536 ±1.82	1.1477 ±1.25	0.8477* ±1.16 (-27.46)	0.7124** ±1.51 (-38.24)	0.5645*** ±1.31 (- 50.81)	0.8944*** ±1.21 (-23.46)	0.8377* ±1.83 (-27.38)	0.7722** ±1.66 (-37.94)
	Digestive glands	1.4817 ±1.59	1.4284 ±1.93	1.4268 ±1.55	0.9841** ±1.44 (-33.58)	0.7816*** ±1.84 (-45.28)	0.5833*** ±1.42 (-59.12)	1.0925** ±1.75 (-26.27)	0.9122*** ±1.78 (-36.14)	0.7911* ±1.04 (-44.55)
	Gonad	1.3256 ±1.27	1.3245 ±1.61	1.3159 ±1.76	0.9477* ±1.79 (-28.51)	0.7864** ±1.92 (-40.63)	0.7582** ±1.13 (-42.38)	0.9843*** ±1.25 (-25.75)	0.8915** ±1.63 (-32.69)	0.8651*** ±1.17 (-34.26)
	Whole soft body	0.9688 ±1.07	0.9450 ±1.18	0.9385 ±1.46	0.7324*** ±1.08 (-24.40)	0.6125* ±1.77 (-35.18)	0.4865*** ±1.31 (-48.16)	0.7763* ±1.98 (-19.87)	0.6458** ±1.74 (-31.66)	0.5766** ±1.65 (-38.56)

1. Values expressed as mg/100mg dry wt. of tissue
2. (+) or (-) indicate percent variation over control
3. ± indicate S.D. of three obsevation
4. Values are significant at *P<0.001, **P<0.01, ***P<0.05
5. NS (Not significant)

Table No. 2. Total ascorbic acid content in different soft body tissues of *Lamellidensmarginalis*afterchronic exposure to Carbosulfan and its subsequent recovery.

Sr. No.	Tissue	Carbosulfan	Recovery in normal water (i)			Recovery in A.A. (50 mg/l) (ii)		
		21 days	7 days	14 days	21 days	7 days	14 days	21 days
1	Mantle	0.5042 (-45.08)	0.5407** ±1.73 (+7.24)	0.5579*** ±1.48 (+10.65)	0.6145** ±1.61 (+21.88)	0.6078*** ±1.13 (+20.55)	0.7195** ±1.51 (+42.70)	0.8512*** ±1.55 (+68.82)
3	Gills	0.5645 (-50.81)	0.6495** ±1.35 (+15.06)	0.6854** ±1.87 (+21.42)	0.7659*** ±1.91 (+35.68)	0.7579** ±1.53 (+34.26)	0.8419*** ±1.81 (+49.14)	1.0945*** ±1.41 (+93.89)
4	Digestive glands	0.5833 (-59.12)	0.6494** ±1.29 (+11.33)	0.6835** ±1.19 (+17.18)	0.7412* ±1.68 (+27.07)	0.7385** ±1.35 (+26.61)	0.8365** ±1.73 (+43.41)	1.0687*** ±1.99 (+83.22)
5	Gonad	0.7582 (-42.38)	0.8016** ±1.21 (+5.72)	0.8456** ±1.88 (+11.53)	0.8973*** ±1.72 (+18.35)	0.8879*** ±1.78 (+17.11)	1.0574*** ±1.95 (+39.46)	1.2454* ±0.96 (+64.26)
6	Whole soft body	0.4865 (-48.16)	0.5274** ±2.01 (+8.41)	0.5913** ±1.12 (+21.54)	0.6773** ±1.43 (+39.22)	0.6671*** ±1.88 (+37.12)	0.7125** ±1.59 (+46.45)	0.8526* ±1.17 (+75.25)

1. Values expressed as mg/100mg dry wt. of tissue
2. (+) or (-) indicate percent variation over control
3. ± indicate S.D. of three observations
4. Values are significant at *P<0.001, **P<0.01, ***P<0.05
5. NS (Not significant)

Fig. 1. Profiles of ascorbic acid content in different tissues after chronic exposure to carbosulfan without and with ascorbic acid.

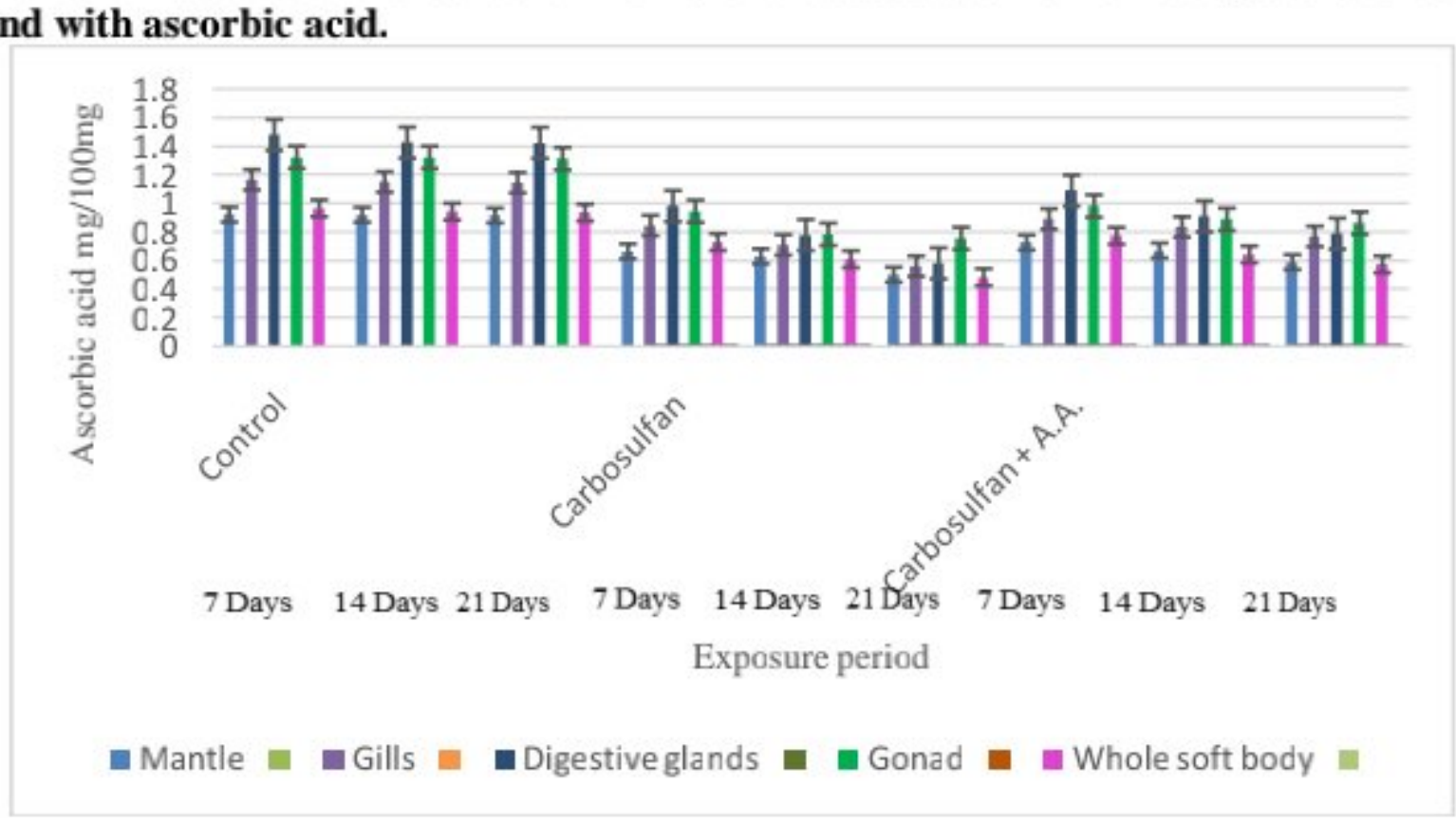
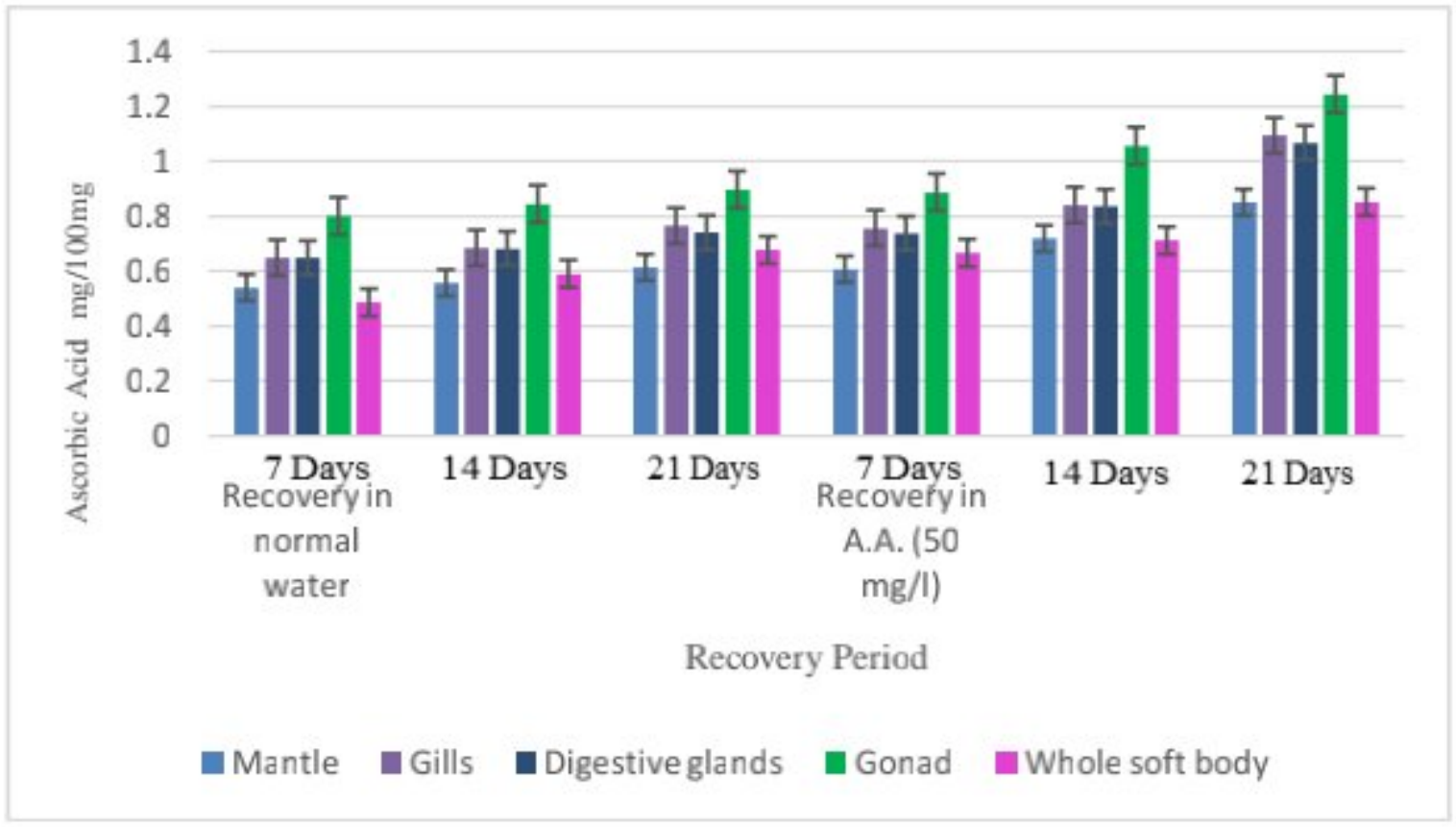


Fig. 2. Profiles of ascorbic acid content in different tissues afterchronic exposure to Carbosulfan and its subsequent recovery.



Results and Discussion:

Biochemical estimation of ascorbic acid contents was determined from the different tissues i.e. mantle, gills, digestive glands, gonads and whole soft body tissues of experimental model, the freshwater bivalve *Lamellidensmarginalis*from control and experimental groups and obtained results are presented in table nos. 1 and 2.

Table No. 1 and 2 indicates changes in ascorbic acid levels of mantle, gills, digestive glands, gonads and whole soft body of *Lamellidensmarginalis* on chronic exposure to carbosulfan (0.5564 ppm) without and with ascorbic acid and during recovery. It is noticed that ascorbic acid contents were significantly reduced after carbosulfan exposure in all tissues of the bivalves as compared to control. Bivalves exposed to carbosulfan with ascorbic acid showed fewer alterations in the ascorbic acid contents showing the protective role of the ascorbic acid. The results also demonstrate that there was progressive decrease in the ascorbic acid contents as exposure period was increased.

When the bivalves exposed for 21 days to carbosulfan were allowed to recover, ascorbic acid recovery was at a very slow rate in naturally curing bivalves. Ascorbic acid contents recovered faster during 21 days in all tissues in ascorbic acid and the comparative rate of recovery was better in ascorbic acid.The comparative tabulated results represent increased or decreased levels of Ascorbic acid in respective tissues during treatment and recovery period.

After chronic exposure to carbosulfan, depletion of ascorbic acid levels was detected in the mantle, gills, digestive glands, gonads, and whole soft body tissues of the experimental freshwater bivalve, as compared to bivalves maintained as controls. The findings of Jadhav et al. (1996), Padmaja and Reddy (1998), Waykar and Lomte (2001 and 2004) and Borane (2006)are in agreement with this.

There was a decrease in the content of ascorbic acid in various soft body tissues of the experimental bivalve species, which could be due to its role in detoxification or impairment in its synthesis (Waykar et al., 2001), repairing tissue injuries, and coping with pesticide-induced toxic stress. This also shows that the use of ascorbic acid in response to pesticide stress increases the demand for energy. The decrease in ascorbic acid content indicated that it was involved in oxidative damage prevention. As far as present work is concerned, decrease in ascorbic acid content in different tissues of *Lamellidensmarginalis* might be due to its involvement in detoxification and repairing of injuries in tissues which occurred due to pesticide stress.

In this study, it was observed that when pesticide was coupled with 50mg/l of L-ascorbic acid, the ascorbic acid level was higher than when pesticides were used alone. Thus, use of L-ascorbic acid protects tissues from oxidative damage caused by pesticides. Several other researchers observed the effect of ascorbic acid in protecting against pesticide-induced ascorbic acid depletion (Mahajan and Zambare, 2006 and Mahajan, 2007).

Vitamin ascorbic acid is an antioxidant. It has a critical role as an antioxidant in tissues, protecting them from oxidative damage. Ascorbic acid's antioxidant properties aid in the prevention of free radical production from water soluble compounds, which can lead to cellular damage and illnesses. Vitamin C has been demonstrated to play a critical role in corticosteroid hydroxylation, oxygenation, and oxidation (Chaterjee, 1967). Ascorbic acid's role in illness and tissue repair is well understood (Halver 1972). Ascorbic acid is therefore perfect for the detoxification of pesticides from animal bodies.

References:

1. **Borane, Vijay R. (2006):**Protective role of Ascorbic acid on the lead chloride induced alterations intheAscorbic Acid contents of the fresh water fish, *Channa orientalis*(Schneider). Central European Journal of ExperimentalBiology, 2013, 2 (4):34-37.
2. **Chatterjee, G.G. (1967):** Effect of ascorbic acid deficiency in animals. In: The vitamins. Eds Sebrell, W.H. Jr. and Harris, R.S. Vol. I, Chemistry, Physiology, Pathology methods, Academic Press, New York. Pp. 407-485.
3. **Chinoy, N.J. and Seethalakshmi, L. (1977):** Biochemical evidence for the occurrence of a possible steroidal mechanism in the reproductive organs of slugs (*Laevicaulisalte*). In : Advances in invertebrate reproduction, Vol. 1 eds. K.G. Adiyodi and R.G. Adiyodi, Peralam. Kanoth, Kerala, India., 356-366.
4. **Chinoy, N.J., Narayana, M.V., Dalal, V., Rawat, M. and Patel, D. (1995):** Amelioration of fluoride toxicity in some accessory reproductive glands and spermatozoa of rat. Fluoride, Vol.28 (2);75-86.
5. **Deshmukh, Shrikant (2012):** Effect of L- ascorbic acid on copper induced alterations in protein, ascorbic acid and DNA content of freshwater bivalve, *Indonaia caeruleus*. National Journal of Life Sciences, 9(11); 37-41.
6. **El-Gendy, K.S., Aly, N.M., Mahmoud, F.H., Kenawy, A. and El- Sebae, A.K.H. (2010):** The role of vitamin C as antioxidant in protection against endogenous oxidative DNA damage in human sperm. Proc. Natl. Acad. Sci. USA., 88; 11003-11006.
7. **Geter, D.R., Kan, H.L., Lowe, E.R., Rick, D.L., Charles, G.D., Gollapudi, B.B. and Mattsson, J.L. (2008):** Investigations of oxidative stress, antioxidant response and protein binding in chlorpyrifos exposed rat neuronal PC12 cells. Toxicol. Mech. Methods. 18; 17-23.
8. **Gould, B.S. (1963):** In: Directed Biosynthesis, Nauka, Moscow.
9. **Gwozdzinski, Krzysztof, Gonciarz,M., Kilanczyk, E. Kowalczyk, A., Pieniązek, A. and Brichon, G. (2010):** Antioxidant enzyme activities and lipid peroxidation in *Mytilus galloprovincialis*from the French Mediterranean coast. International Journal of Oceanography and hydrobiology, 34(4); 33-43.
10. **Halver, J.E. (1972):** The role of ascorbic acid in fish disease and tissue repair. Bull. Jap. Soc. Sci. Fisheries. 35(1); 79-92.
11. **Jadhav, S., Sontakke, Y.B. and Lomte, V.S. (1996):** Effect of carbaryl onascorbic acid content in the selected tissues of Corbicula striatela. J.Ecotoxicology. Env. Monit. 6(2): 109-112.
12. **Jain, M. and Kulshrestha, K. (2000):** Effect of pesticides on fishes. A review of recent studies in India J. National. 7(2); 14-1188.
13. **Joseph, B. and Raj S.J. (2010):** Effect of curacron toxicity on the total serum protein content of *Cyprinus carpio*. Toxicol. Environ. Chem., 92; 1889-1893.
14. **Mahajan, S. S. (2007):** Ascorbate effect on certain Heavy metal induced physiological alteration in the freshwater bivalve, *Lamellidinsmarginalis* (Lamarck). Ph. D. Thesis submitted to North Maharashtra University, Jalgion. (M. S.), India.
15. **Mahajan, S.S. and Zambare, S.P. (2006):** Effect of L-ascorbic acid supplementation on arsenic induced alterations in the ascorbic acid levels of an experimental model, *Lamellidensmarginalis* (Lamarck). J. Aqua. Biol., 21(2); 222-227.
16. **Mahananda, M.R., Behera, N.R. and Mohanty, B.P. (2010):** Protective efficacy of L-ascorbic acid against the toxicity of mercury in *Labeorohita* (Hamilton). The Bioscan, 3; 681-690.
17. **Manduzio, H., Rocher, B., Durand, F., Galap, C. and Leboulenger, F. (2005):** The point about oxidative stress in mollusks. ISJ., 2; 91-104.
18. **Naidu, K.A. (2003):** Vitamin C in human health and disease is still a mystery? An overview. Nutrition journal, 2; 7.
19. **Olea, N and Fernandez, M.F. (2007):** Chemicals in the environment and human male fertility. Occup. Environ. Med., 64; 430-431.
20. **Padmaja, N.C. and Reddy, P.U.M. (1998):** Ascorbic acid status in certainselective tissues of a fresh water fish, *Anabas testudineus*during exposureand recovery to chromium toxicity. J. Ecotoxic. Environ. Monit., 8; 225-228.
21. Roe (1967)
22. **WaykarBhalchandra and Lomte, V.S. (2004):** Carbaryl induced changesin the ascorbic acid content in different tissues of fresh water bivalve,*Parreysia cylindrica*. Asian Jr. of Microbiol. Biotech. Env. Sci., 6(3);181-189.

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Study of physical parameters of vermicompost and growth of Eudrilus eugeniae in different substrates

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Abstract: The growth of *eudrilus eugeniae* were evaluated in different substrates like *Cascabela peruviana,Partherium hysterophorus*, Poultry waste, sericulture waste; sugarcane leaves trash mixed with bedding material (cow dung and soil) in the ratio of 6:3:1. Biomass gain, sexual maturity, mortality was monitored periodically for 60 days. At the end formed vermicompost being separated and their quality checked in lab. The maximum weight gain observed in sugarcane leaves trash as substrate with cow dung as a bedding material. The result of the present study suggest that the substrate like sugarcane leaves trash with soil and cow dung at 6:3:1 proportion can very well used to increase growth and number of earthworms.
KeyWords: vermicompsot, growth, quality, substrates.

Introduction:

Vermicomposting involves physical and biochemical action of earthworms in converting organic materials (usually wastes) into two useful products- the earthwormbiomass and high quality organic soil conditioner, the vermicompost. The physical action includes substrate mixing and loosening, maintaining aerobic condition and actual grinding. The vermicompost promotes plant growth over conventional compost and over chemical fertilizer. It providesan organic carbon, organic matter, Fe, Zn, NPK, and also provide enzymes and hormones which stimulates plant growth. The waste material isdegradedbyover75% fasterthan conventional system and compost produced are cleansed of harmful microorganisms and toxic substance, and enriched with nutrients and beneficial soil microbes. (SinhaR. K. 2010). Vermicomposting efficiency is measured by the biomass produced and by the vermicompost yield in a certain period of time. To get the maximum efficiency of vermicomposting, the compost worms must be provided with the five basic things that they need. These are favorable living environment, usually called "bedding"; food source; correct moisture of the substrate (not too low, not too high); adequate aeration; and protection from too high or too low temperatures. (Munroe G. 2004).Since moisture holding capacity and aeration are characteristics of bedding, in general, the selection of bedding materials is a key to successful Vermiculture or vermicomposting. Worms can be highly productive (and reproductive) if conditions are favorable; however, their efficiency drops off rapidly when their basic needs are not met. (Manaig Elena M.2016)Good bedding mixtures are an essential element in meeting those needs. The different substrates that can be used with cow dung bedding material have different characteristics. The difference can affect directly the reproduction and growth of worms, and the amount of substrate that can be broken down by worms into compost. The bedding material provides a hospitable environment and the food source, nutrition for the worms. (Manaig Elena M. 2016). In this study it was hypothesized that the different substrate (bedding material + different food source) will affect the efficiency of producing worm and compost.

Materials and Methods:-

Materials:-

- **Breeder stock: -** Eudrilus eugeniae selected as breeder stock. Breeder procured from the ''Shri Vermiculture Unit'' at Chinchpur, Tal: - Sangamnaer, Dist: - Ahemdnagar, Maharashtra.
- **Bedding material**:-Cow dung is used as bedding material.
- **Substrate: -** (All substrate are collected fromKolhar Bhagwatipur, Tal-Rahata, Dist- Ahemdnagar, and Maharashtra.)

1) ***Cascabela peruviana*** **(kaner)**
2) **Sugarcane leaves trash (pachrat)**
3) ***Partherium hysterophorus*** **(congress)**
4) **Poultry waste**
5) **Sericulture waste**
6) **Mixture: -**This set contains Cascabela peruviana , congress, sugarcane leaves trash, sericulture, poultry are as substrate.

Methods:

Experimental design:-

The experiment was performed in 7 plastic pots having capacity around 5 kilogram. Each plastic pot contains a different treatmemt material.

- **The combination of bedding material with substrate used in experiment.**

1) Cow dung (T1)
2) Cow dung &kaner (T2)
3) Cow dung & sugarcane leaves trash (T3)
4) Cow dung & congress (T4)
5) Cow dung & poultry waste (T5)
6) Cow dung & sericulture waste (T6)
7) Cow dung and mixture (T7)

- **Preparation of substrate:-**

The collected materials are shed dried for 4 to5 days.

Prepare bed of 1 kg in each pot at proportion of cow dung as bedding material to each substrate to soil 6:3:1 was used. Pre-decomposed waste is an ideal medium for the worms to act on.(Rajendran P. E.,2015)

- **Data collection:-**

The weight of worms loaded to each pot was near to 15 gm. The total 12 worms in each pot were loaded. This was the biomass (weight) at the Day 1. Before loading on substrate, the number of worms was determined and served as the worm number at Day 1. At 30 days and 60 days vermicomposting, total worm biomass was determined by weighing and the number by counting the individual worms of any size. The worms were first taken from the substrate by hand, and the substrate materials were gently removed. To facilitate removal of the adhering material on the earthworm body, the hands are moistened first. Data on the increase in number and weight were obtained by subtracting the initial measurements from the measurements at Day 30 and a Day 60. The data were collected and recorded by replication.

At the end of the experiment (Day 60), the uncomforted potion of the substrate was separated from the composted part. The harvested vermicompost was then mixed thoroughly and then air-dried for one day. The time of harvesting was based on the recommendation that vermicompost should be harvested when most of the materials have been consumed by the worms. (Sivakumaran S., 2014).

- **Statistical analysis:-**

All the the collected data from two months of weight of worm and number of worm was analyzed. The mean for two replicates was used as descriptive tool.

- **Analytical methods:-**

The some parameters of samples were analyzed in Department of zoology and Department of Biotechnology at PVP collage Loni, Maharashtra, and some parameters are analyzed at Krishi Vigyan Kendra (PIRENS), A/P. Babhaleshwar- 413737, Tal-Rahata, Dist-Ahemdnagar, Maharashtra (India).

The analyses of different substrates and their subsequent vermicomposts were carried out for, Iron, EC, pH, organic carbon, organic matter, C: N ratio, Zinc etc.

1. **Determination of pH:**-The pH of the sample was determined as per the procedure described by (Chandraboseet al., 1988).
2. **Electric conductivity:-**The electric conductivity of the test Sample on electric conductivity machine.
3. **Organic matter and Organic carbon:-**The determination of Organic carbon and Organic matter was carried out as per the procedure of Muffle Ash Method.
4. **Moisture:-**The moisture of given sample was determined on the Oven dry basis.
5. **Iron (Fe) and Zinc (Zn):-**The iron and zinc of the given sample was estimated by the DTPAAS Extraction/ AS Method.

Result and Discussion:-

Worm Weight: -The mean weight and weight increases are shown in Table 2and Fig.2. At day 60 there was significantly increase in weight of worm in Sugar cane leaves trash (T3) followed by Kaner (T2). There was a decrease in worm weight in Mixture (T7) followed by Poultry (T5). High bulking potential, absorbency and carbon: nitrogen ratio is desirable characteristics of worm beddings. (Munroe G. 2004). The low worm count in mixture mixture (T7) and poultry (T5) were recorded and hence low worm biomass. The increase in worm weight in substrates with Sugar cane leaves trash (T3) and kaner (T2) were highest compared with the weight increase in substrates without these materials. This higher increase of worm weight was due to the greater worm counts. Likewise, the lower weight increment in substrates with poultry (T5) and mixture (T7) 1 was due to lower worm counts. This result matches the result of an

experiment that showed an increase in the growth of individual earthworm's at lower population density but greatest overall earthworm biomass production at the highest population density. (Dominguez J. 2001). The greater biomass in substrates with Sugar cane leaves trash (T3) and kaner (T2) was due to the greater number of worms. There was an inverse relationship between population density and the growth rates of individual worms.(Manaig Elena M. 2016)

Table-2 Weight and increases in the weight of worms.

Treatment		Weight of worm (in gm)			Increase in weight (in gm)		
Set	**composition**	**Day1**	**Day30**	**Day60**	**Day1to30**	**Day30to 60**	**Day1 to60**
T1	Cow dung	15.67	17.734	20.532	2.064	2.798	4.853
T2	Kaner	15.66	18.517	20.717	2.857	2.21	5.057
T3	Sugar cane leaves trash	15.609	21.33	28.566	5.721	7.236	12.957
T4	Congress	15.257	16.979	17.888	1.722	0.909	2.631
T5	Poultry	15.41	10.176	10.160	-5.232	-0.016	-5.25
T6	Sericulture	15.881	17.211	19.067	1.33	1.856	3.186
T7	Mixture	15.868	10.137	10.142	-5.731	0.005	-5.526

PH: The highest acidic pH is reported in sericulture (T6) followed by the congress (T4).
And reaming substance has an approximately neutral pH.

Electricconductivity: The increase of electrical conductivity in vermicompost when compared to the control might be due to the presence of exchangeable calcium, magnesium and potassium in worm cast than the soil (Bhavnagar and Palta, 1996 and Balamurugan et al., 1999).

High electric conductivity observed in mixture (T7) i.e., there is no movement of ion from cathode to anode and vice versa, i.e. there is no increase in worm biomass. The lowest electric conductivity was observed in Sugar cane leaves trash (T3) i.e. there is a highly increased worm biomass.

Organic matter: - The highest organic matter was reported in Sugar cane leaves trash (T3) followed by cow dung (T1). It is very important in the low organic matter soil, to provide habitat for living organisms. The lowest organic matter was reported in sericulture (T6).

Organic carbon:

The highest organic carbon was reported in Sugar cane leaves trash (T3) followed by cow dung (T1). For the better organic carbon the T3, T1 is the best compost. The lowest organic carbon was noted in congress (T4) followed by sericulture (T6).

C: N Ratio: - The C: N ratio is important because due to the fact that it has a direct impact on residue decomposition and also nitrogen cycling in our soils. The present study wasshowing that the highest C: N ratio in Sugar cane leaves trash (T4) followed by the Kaner (T2) and Mixture (T7). The lowest C: N ratio was reported in the poultry (T5) followed by the congress (T4).To make the better compost of high C: Nratio the T4, T2, T7 are the best treatments.

Moisture:-In the tested sample in this work the Sugar cane leaves trash (T3) has highest moisture which followed by the cow dung (T1) and kaner (T2). In the mixture (T7) the very low moisture is reported. The present study was show that the treatment T3, T1, and T2 are the best compost for the moisture to increases moisture in the soils to supply of nutrients medium to growing plants.

Zinc (Zn):- The significantly high zinc content was reported in the sericulture (T6) and congress (T4) followed by the kaner (T2). In the cow dung (T1) the zinc content was very lowest as compare to other treatment.

Iron (Fe): - In the present study the Kaner (T2) was show the high iron compost which is followed by the congress (T4). The lowest iron was noted in the cow dung (T1) followed by the Sugar cane leaves trash (T3). The high iron in T2 and T4 is due its chlorophyll pigments. The treatments T2 and T4 are the best compost to yield the high iron fertilizer.

Table–3 Result of assay of Vermicompost for pH, Ec, Organic Carbon and matter, C: N ratio, Moisture, Zn, Fe content.

Treatment	pH	Ec	Org.carbon %	Org.matter %	C:N ratio	Moisture %	Zinc(Zn) ppm	Iron(Fe) ppm
T1	7.78	2.94	55.50	32.27	16.46	57.60	101.42	4918.81
T2	7.94	2.44	46.50	27.03	17.55	57.60	119.63	9540.72
T3	7.69	1.35	65.00	37.79	26.99	61.60	110.52	6126.82
T4	8.11	3.39	41.00	23.84	14.19	53.60	120.32	7889.56
T5	7.94	3.64	45.50	26.45	12.59	52.40	116.00	7453.04
T6	8.32	2.77	44.50	25.87	14.21	53.20	120.33	6536.33
T7	7.69	5.96	46.50	27.03	17.55	47.60	119.19	6954.44

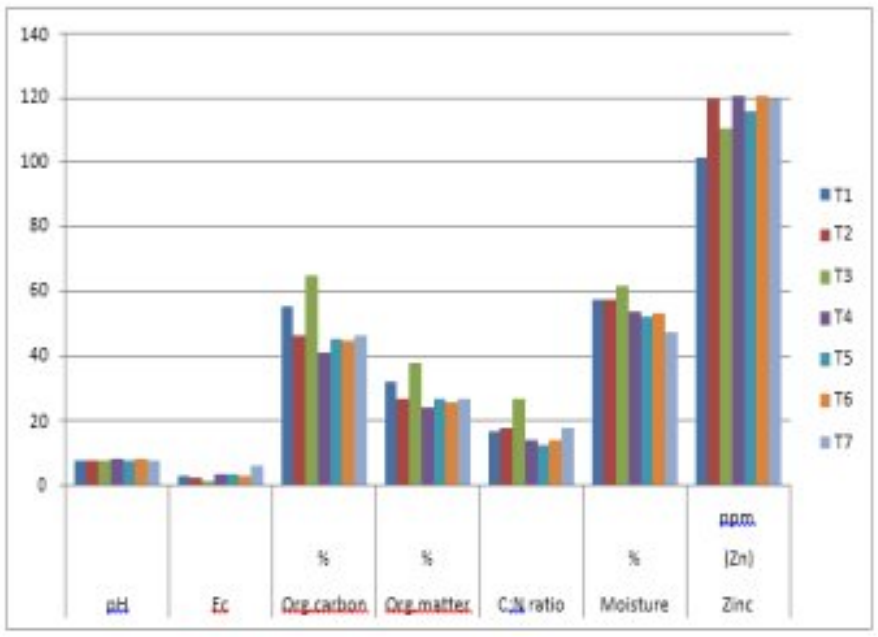

Fig. 3:- Result of assay of vermicompost for pH, Ec Org.carbon and matter, C:N ratio, Moisture, Zn content.

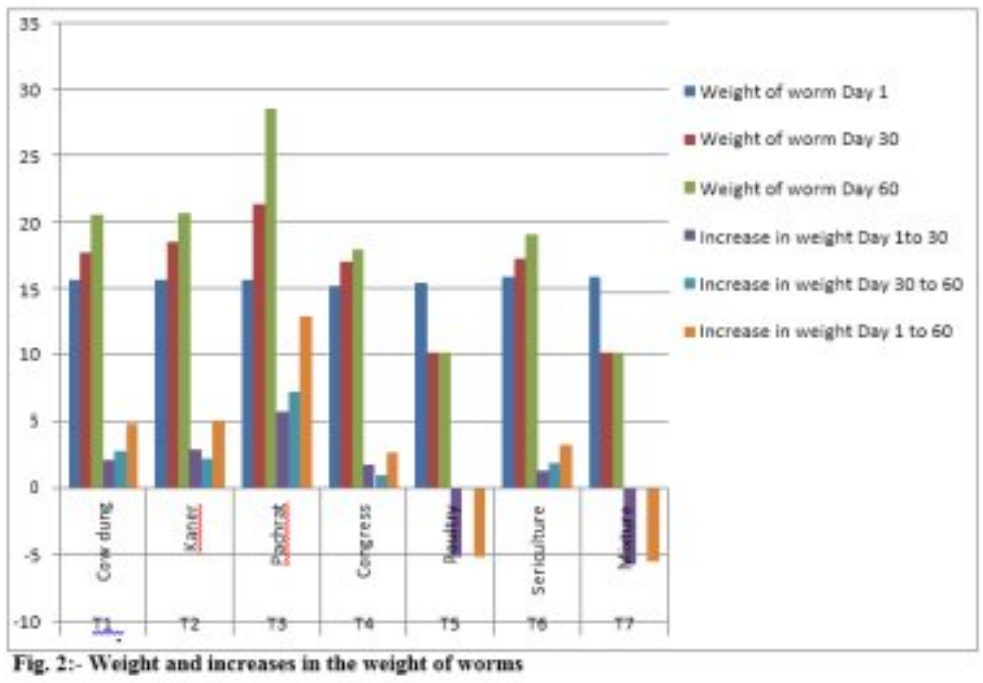

Fig. 2:- Weight and increases in the weight of worms

Conclusion:

In the first half of the present study indicated that the Sugarcane Trash (T3) and Kaner (T2) are favorable for total weight gain of worms and less favorable (T5). For the production of the high quantity of earthworm biomass as commercial level the Sugarcane Trash is a good substrate with cow dung to vermicompost.

However the Sugarcane Trash and Kaner is the better to yield high biomass. From the above study it is conclude that the congress (T4) is the best substrate that are the significant for the production of the worm biomass.

Different substrate gives different result on selected vermicomposting parameter. Each substrate material has characteristic that are different of other materials and can influence different the performance of worms. This means that the efficiency of vermicomposting is affected by the substrate material. The selection of appropriate substrate could optimize vermicomposting efficiency.

References:-

1. Aparna Ektare, Ragini Didolkar (2016), Physio-Chemical Parameters of Vermicompost Using Eisenia Foetida in Garden Waste. J. Ento. And Zoologystudies.4 (5), 255-257.
2. Borah, M.C., Mahanta, P., Kakoty, S.K., Saha, U.K. And Sahasrabudhe, A.D. (2007) Study of Quality Parameters in Vermicomposting. Ind. J. Biotechnology., 6,410-413.
3. Daniel T., Sivasankari B. And Malathy M. (2010), Microbial And Nutrient enhancement Of Gliricidiasepium And Leucaenaleucocephala Leaf Materials Usingeisenia fetida,In Vermitechnology, N.Karmegam, Ed., 4(1), 152–154.
4. Didem Boran, Ayten Namli, Muhittin Onur Akca (2017), Determination Of Quality Parameter Of Vermicompost Under Different Thermal Techniques. Fresenius Environmental Bulletin 26(8), 5205-5212.
5. Dominguez J., Edwards C.A. And Ashby J. (2001), The Biology And Population dynamics Of Eudrilus eugeniae (Kinberg) (Oligochaeta) In Cattle Waste Solids, Pedobiologia,45, 341–353.
6. Manaig Elena M. (2016), Vermicomposting Efficiency And Quality Of Vermicompost With Different

Bedding Material And Worm Food Source As Substrate. Res. J. Agriculture And Forestry Sci. 4(1), 1-13.

7. Munroe G. (2004), Manual Of On-Farm Vermicomposting And Vermiculture.

8. P.Kaushikand V.K.Garg(2003),Vermicomposting Of Mixed Solid Textile Emillsludge And Cow Dung With The Epigeic Earthworm Eisenia Foetida, Bioresourcetechnology,90(3), 311–316.

9. Pattnaiks Andreddym.V.(2010),Nutrient status of vermicompost of Urban green waste Processed By Three Earthworm Species- Eisenia fetida, Eudrilus eugeniae And Perionyx Excavates, Applied And Environmental Soilscience,20, 101-14.

10. S. Suthar And S. Singh (2008), Vermicomposting Of Domestic Waste By Using Twoepigeic Earthworms (Perionyx Excavatus And Perionyx Sansibaricus), Internationaljournalof Environment Science and Technology,5(1), 99–106.

11. Sinha R.K., Agarwal S., Chauhan K., Chandran V And Kiranbhai B. (2010),Vermiculture Technology: Reviving The Dreams Of Sir Charles Darwin Forscientific Use Of Earthworms In Sustainable Development Programs,Technologyandinvestment, 1, 155-172.

12. Sivasankari B, Indumathi S. And Anandharaj M. (2013), A Study On Life Cycle Ofearth Worm Eudrilus eugeniae. International Journal of Research in Pharmacy and lifesciences, 1(2)64-67.

13. Suthars. (2007), Vermicompostingpotentialofperionyxsansibaricus(Perrier). Indifferentwaste Materials,Bioresourcetechnology,98, 1231–1237.