JK pub
Pune

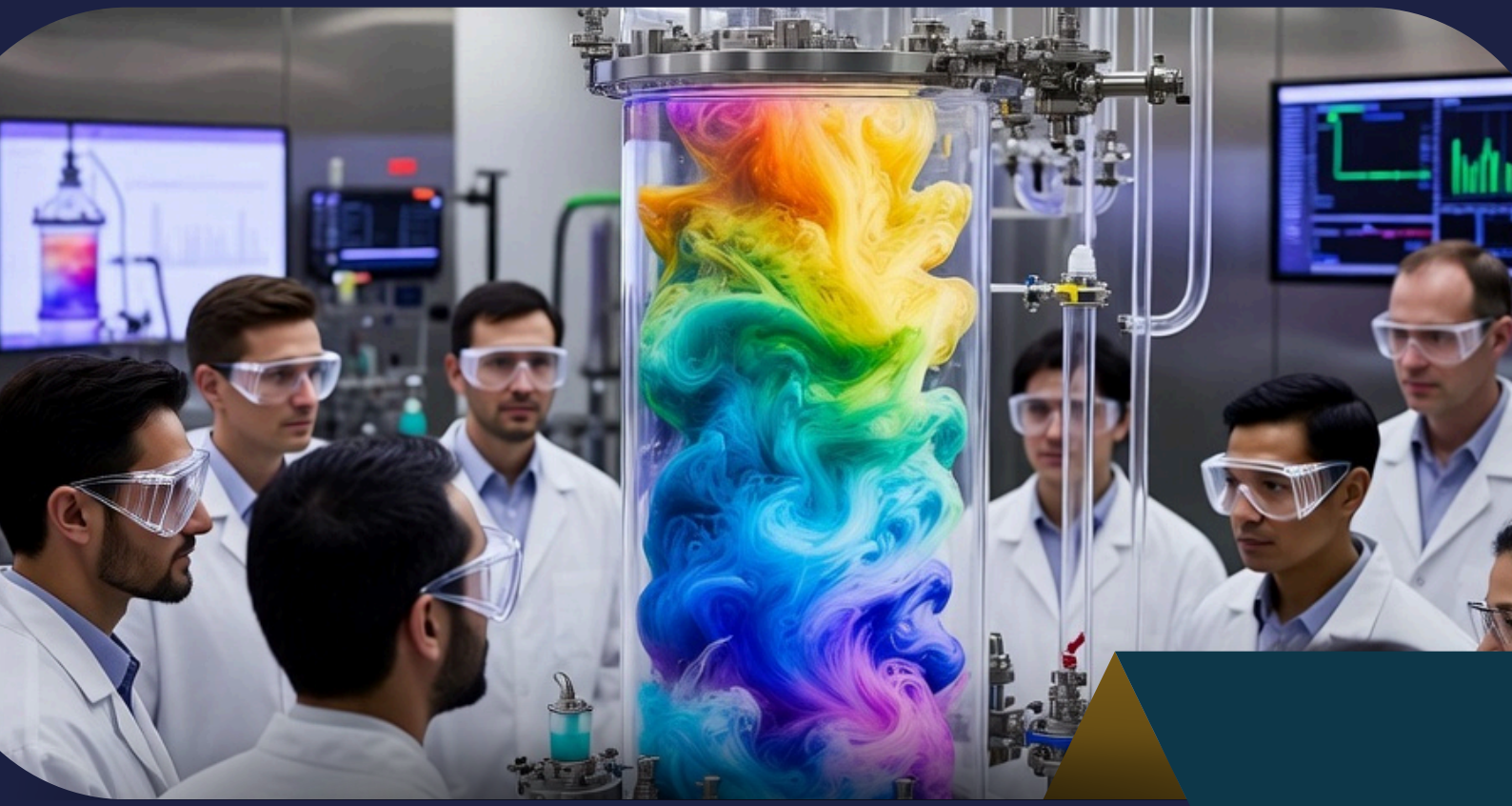
SOUVENIR

ISBN:978-93-47108-51-8

INTERNATIONAL CONFERENCE ON

Emerging Trends in Chemical Science: Innovation Beyond Boundaries

Date-11 April 2026, Day-Saturday



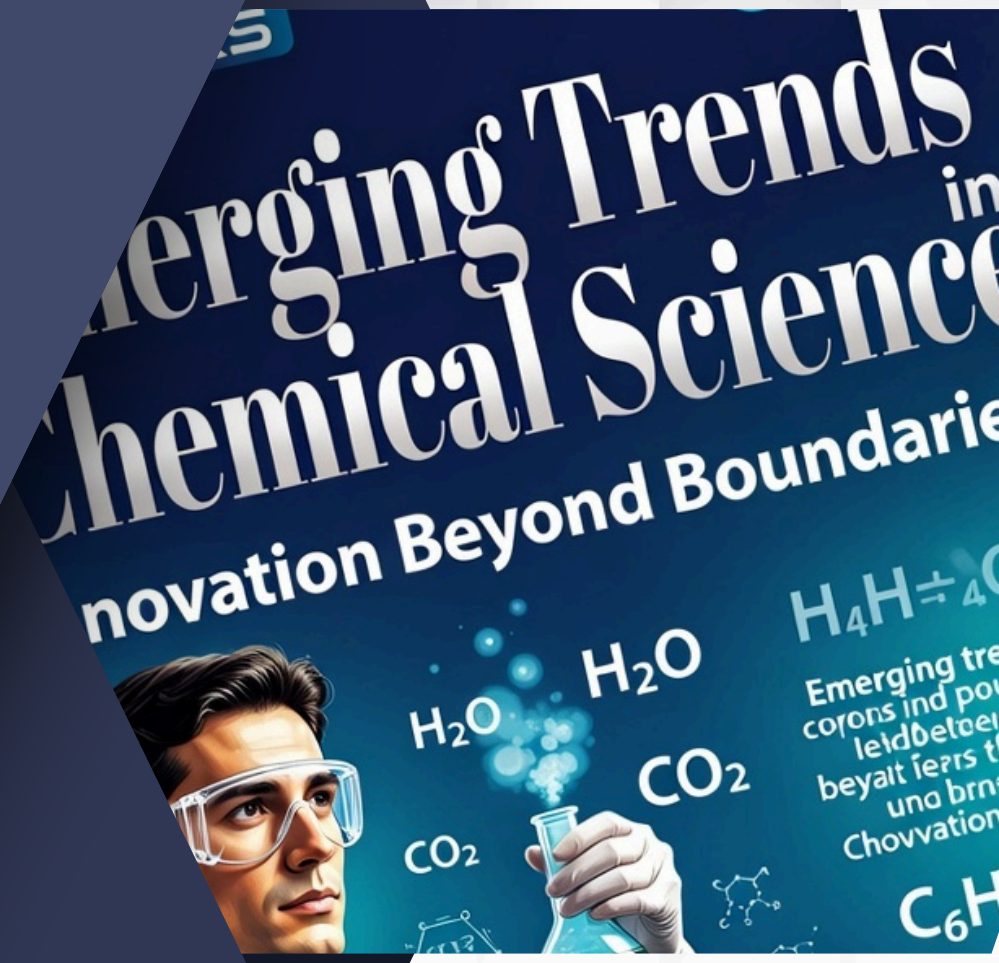
Editors

Dr. B.M. Khamkar, Dr. Sadanand B. Dharap

Dr. Sajid F. Shaikh, Dr. Sachin Vasant Bangale

Dr. Aamod N. Thakkar, Dr. Yogesh Prabhakar Borale

JK pub
Pune



Editors

Dr. B.M. Khamkar, Dr. Sadanand B. Dharap,
Dr. Sajid F. Shaikh, Dr. Sachin Vasant Bangale,
Dr. Aamod N. Thakkar, Dr. Yogesh P. Borale

ISBN 978-93-47108-58-7

Jyotikiran Publication, Pune
Sr. No. 204, Sahajeevan Society,
Bhekrinagar, Hadapsar, Pune-8
Website: https://jkpub.in
Mob- 8888454089
Email- jkpub1950@gmail.com

Innovations for a Sustainable and Advanced Future

Editors

Dr. B.M. Khamkar
Principal
D.G. Tatkare Mahavidvalav, Mangaon, Raigad

Dr. Sadanand B. Dharap
Principal
Bhausaheb Nene Asc College Pen-Raigad

Dr. Sajid F. Shaikh
I/C Principal
Anjuman Islam Janjira Degree College
Of Science Murud Janjira

Dr. Sachin Vasant Bangale
I/C Principal
G.M. Vedak College Of Science,
Tala - Raigad

Dr. Aamod N. Thakkar
I/C Principal
Veer Wajekar Asc, College Phunde, Uran, Navi Mumbai

Dr. Yogesh Prabhakar Borale
I/C Principal
Dr. Babasaheb Ambedkar College Mahad – Raigad

Co- Editors

Ms. Mehreen Dawre
Convener
D.G. Tatkare Mahavidvalav, Mangaon,
Raigad

Dr. Gurumeet Wadhava
Convener
I/C Principal
Veer Wajekar Asc, College Phunde,Uran, Navi Mumbai

Dr. M. H. Salunke
Convener
Bhausaheb Nene Asc College Pen-Raigad

Mr. J. V. Deore
Convener
G.M. Vedak College Of Science,
Tala - Raigad

Mr. Shoyeb Khan
Convener
Anjuman Islam Janjira Degree College
Of Science Murud Janjira

Dr. P. M. Khandare
Convener
Dr. Babasaheb Ambedkar College Mahad, Raigad

Jyotikiran Publication, Pune Website: https://jkpub.in Email: jkpub1950@gmail.com

Emerging Trends in Chemical Science: Innovation Beyond Boundaries

Editors
Dr. B.M. Khamkar, Dr. Sadanand B. Dharap, Dr. Sajid F. Shaikh, Dr. Sachin Vasant Bangale, Dr. Aamod N. Thakkar, Dr. Yogesh Prabhakar Borale

Co-Editors
Ms. Mehreen Dawre, Dr. Gurumeet Wadhava,
Dr. M. H. Salunke, Mr. J. V. Deore,
Mr. Shoyeb Khan, Dr. P. M. Khandare

Publishing Agency: Jyotikiran Publication, Pune

Publisher Address
Santosh Pandurang Mane
House No-11 Deshmukh Colony Malshiras-Mhaswad Road,
At/Post/Tal-Malshiras,
Dist-Solapur Tal-Malshiras, Dist-Solapur
and,
Sr. No. 204, Sahajeevan Society, Bhekrinagar, Hadpsar, Pune-8
Mob- 8888454089,
Email: jkpub1950@gmail.com
Website: https://jkpub.in
Working Hours: 10:30 AM-5.30 PM (Monday to Saturday)
Printed By
Star Copiers Pvt. Ltd.
728/A, RB Kumthekar Rd, Sadashiv Peth, Pune, Maharashtra 411030

Edition Details: Ist

ISBN: 978-93-47108-58-7

Pub. Date: 11th April 2026

Price: ₹ 300/-

MSPM's D. G. TATKARE COLLEGE OF ARTS SCIENCE, COMMERCE, MANAGEMENT & IT

MANGAON, DISTRICT-RAIGAD, (MS) INDIA, 402104. (AFFILIATED TO UNIVERSITY OF MUMBAI)

DEPARTMENT OF CHEMISTRY

IN COLLABORATION WITH

ANJUMAN ISLAM JANJIRA DEGREE COLLEGE OF SCIENCE MURUD-JANJIRA,

DISTRICT-RAIGAD, (MS) INDIA, 402401. (AFFILIATED TO UNIVERSITY OF MUMBAI),

RAYAT SHIKSHAN SANSTHA'S VEER WAJEKAR ASC COLLEGE, URAN

MAHALAN VIBHAG, PHUNDE, URAN, NAVI MUMBAI, (MS) INDIA, 400702 (AFFILIATED TO UNIVERSITY OF MUMBAI)

SHRI GOPINATH MAHADEV VEDAK PRATISHTHAN'S G. M. VEDAK. COLLEGE OF SCIENCE, TALA RAIGAD.

(AFFILIATED TO UNIVERSITY OF MUMBAI),

PEN EDUCATION SOCIETY'S BHAUSAHEB NENE ARTS, COMMERCE AND SCIENCE COLLEGE, PEN

(AFFILIATED TO UNIVERSITY OF MUMBAI),

Dr. BABASAHEB AMBEDKAR COLLEGE OF ASC, MAHAD.

(AFFILIATED TO UNIVERSITY OF MUMBAI),

SOUVENIR

INTERNATIONAL CONFERENCE ON

"Emerging Trends in Chemical Science: Innovation Beyond Boundaries"

11th April 2026

ABOUT US...

A milestone- D.G. Tatkare Mahavidyalaya, Mangaon, District- Raigad (Maharashtra) was laid by Late. Ashoka dada Sable in 1993, with the exclusive purpose of offering education to students in rural areas and upliftment of society. Since its establishment, the holy work of providing education to about 1500 poor students of rural areas is being done. The college has been re accredited by NAAC with B+ Grade (Second Cycle CGPA 2.64). The college is affiliated to the University of Mumbai and offers 6 Undergraduate and 6 Postgraduate programs. The college is determined and committed to provide an excellent education in elevated region and dedicated to fostering a diverse and inclusive learning environment that emphasize ethical practice, and lifelong learning, empowering our graduates and post-graduates to lead in a dynamic scenario.

It is one of the prime educational institutions affiliated to University of Mumbai. The college is run by Anjuman Islam Janjira presumably one of the largest educational trusts. It was established in 1907 with the vision of attainment of socio-economic upliftment of minority community by imparting quality education. The college has played an important role in the overall development of Murud Janjira since past 16 years. The college offers B.Sc. and B.Sc. in computer Science, B.M.S. and B.A.F at UG level and M.Sc. Organic Chemistry & Botany Programmes at PG level. In near future Research Centre in Chemistry will start. It underwent assessment and accreditation by NAAC in second cycle and achieved B+ Grade with 2.69 CGPA. This college received best college award by different organizations.

Rayat Shikshan Sanstha's Veer Wajekar Arts, Science & Commerce College, Phunde, Tal-Uran, District-Raigad, was established in 1989 and is affiliated with the University of Mumbai. Managed by Rayat Shikshan Sanstha, a renowned educational trust founded by Padma Bhushan Dr. Karamveer Bhaurao Patil, the college offers undergraduate and postgraduate programs in Arts, Science, Commerce, Information Technology, and Management. Accredited with ***a B++ grade (CGPA 2.99) by NAAC in 4th Cycle 2025, the college has received the Best College Award from the University of Mumbai an. With a highly qualified faculty recognized for their research achievements, the institution continues to foster academic excellence and career growth, driven by a progressive and supportive management.***

Shri Gopinath Mahadev Vedak Pratishthan's G. M. Vedak. College Of Science, Tala Raigad. , was established in 2009 and is affiliated with the University of Mumbai. Managed by Shri Gopinath Mahadev Vedak Pratishthan's, a renowned educational trust founded by Shri Gopinath Mahadeo Vedak, the college offers undergraduate and postgraduate programs in science. Accredited with a B grade by NAAC in 2nd Cycle 2024, The college functions with the motto "Vidyadhanam Sarvadhanam Pradhanam" (Knowledge is the foremost wealth‖), reflecting its commitment t to academic excellence and holistic students 'development.

Pen Education Society's Bhausaheb Nene Arts, Commerce and Science College District- Raigad (Maharashtra) was established in year 1990. The basic objective for running the college is to provide quality education to the students of economically backward class from rural areas. The college has grown from 147 students from the year of establishment to more than 1200 students till date. The institution significantly contributes to the holistic development of students through academics, cultural activities, and value-oriented education. The college's major achievement is its NAAC Re-accreditation with grade B which highlights its dedication towards quality education and academic excellence.

People's Education Society's Dr. Babasaheb Ambedkar College of Arts, Science and Commerce, Mahad, Raigad was established in 1961. It is one of the important educational institutions in Raigad district, offering higher education in Arts, Science and Commerce. The college's major achievement is its NAAC accreditation with grade B+ which highlights its dedication towards quality education and academic excellence. The institution plays an important role in shaping students through academics, cultural activities, and value-based education inspired by Dr. Babasaheb Ambedkar.

CHIEF PATRONS

Hon. Adv. Rajiv Ashok Sable
PRESIDENT
M.S.P.M's D. G. TATKARE
MAHAVIDYALAY, MANGAON

Hon. Shri. Ramdasji Athawale
PRESIDENT
PEOPLE'S EDUCATION SOCIETY

Hon. Mr. Chandrakant N. Dalvi
CHAIRMAN
RAYAT SHIKSHAN SANSTHA,
SATARA

Hon. Shri. Nandkumar G. Vedak
MANAGING TRUSTEE
SHRI G. M. VEDAK PRATISHTHAN'S G.M. VEDAK
COLLEGE OF SCIENCE, TALA- RAIGAD

Hon. Mr. S. Zainuddin S. U. Kadri
CHAIRMAN
ANJUMAN ISLAM JANJIRA DEGREE
COLLEGE OF SCIENCE, MURUD JANJIRA

Hon. Adv. Mangesh V. Nene
PRESIDENT
PEN EDUCATION SOCIETY,
PEN -RAIGAD

CHAIR PERSONS

Dr. B.M. Khamkar
PRINCIPAL
D.G. TATKARE MAHAVIDYALAY, MANGAON,
RAIGAD

Dr. Sadanand B. Dharap
PRINCIPAL
BHAUSAHEB NENE ASC COLLEGE PEN-
RAIGAD

Dr. Sajid F. Shaikh
I/C PRINCIPAL
ANJUMAN ISLAM JANJIRA DEGREE COLLE
OF SCIENCE MURUD JANJIRA

Dr. Sachin Vasant Bangale
I/C PRINCIPAL
G.M. VEDAK COLLEGE OF SCIENCE,
TALA-RAIGAD

Dr. Aamod N. Thakkar
I/C PRINCIPAL
VEER WAJEKAR ASC COLLEGE PHUNDE,
URAN, NAVI MUMBAI

Dr. Yogesh Prabhakar Borale
I/C PRINCIPAL
Dr. BABASAHEB AMBEDKAR COLLEGE
MAHAD - RAIGAD

ORGANISING COMMITTEE MEMBERS

Ms. Mehreen Dawre Convener	Mr. Shoyeb Khan Convener	Dr. Gurumeet Wadhava Convener
Dr. Namita More Co-Convener	Mr. Tamseel Shahjahan Co-Convener	Dr. Smita Tandale Co-Convener
Ms. Vishakha Pawar Organizing Secretary	Mr. Nitin S. Pawar Organizing Secretary	Prof. Dr. Anil Palve Organizing Secretary
Mr. Pankaj Gaikwad Treasurer	Mr. Rahim Bagwan Treasurer	Dr. Maryappa Sonawale Treasurer
Dr. Pandey J.R. IQAC Coordinator	Dr. Amanulla Khan IQAC Coordinator	Dr. Rahul Patil IQAC Coordinator
Ms. Naziya Jummal Member	Mr. Altaf Fakhi Member	Ms. Ratnamala Jawale Member
Mr. Shubham Yerunkar Member	Miss. Bismah Killedar Member	Mr. Yashwan Gaikwad Member

Mr. J. V. Deore Convener	Dr. M. H. Salunke Convener	Dr. P. M. Khandare Convener
Mr. H. R. Sonawane Co-Convener	Dr. V D. Bhabad Co-Convener	Mr. M. V. Jadhav Co-Convener
Mr. A. K. Nikam Organizing Secretary	Dr. S.D. Lakade Organizing Secretary	Mr. S. T. Gore Organizing Secretary
Mr. S. R. Rathod Treasurer	Dr. A.D. Kamble Treasurer	Mr. D. D. Panat Treasurer
Dr. V. A. Rane IQAC Coordinator	Mr. B. M. Shikare IQAC Coordinator	Dr. R.S. Sonar IQAC Coordinator
Miss. S. R. Thakur Member	Dr A.D. Bhise Member	Mr. S. M. Jadhav Member
Miss. D. G. Kamblekar Member	Prof. S. B. Chitnis Member	Mr. P. D. Malusare Member

ADVISORY COMMITTEE MEMBERS

Prof. (Dr.) Ravindra Kulkarni , Vice Chancellor, University of Mumbai
Prof. (Dr.) Ajay Bhamre, Pro-Vice-Chancellor, University of Mumbai
Dr. Shivram Garje, Dean Science, University of Mumbai
Dr. Sonali Patil Principal, J.S.M. College Alibag, Raigad.
Dr. M. A. Badgujar Principal, JSM College, Shivle, Thane.
Dr. Dinesh Bahgat , Principal, APS College, Nagothane
Dr. Nandakishor Chandan, Vice Principal, Sidhharth College of Arts, Science and Commerce, Mumbai
Dr. Manisha Saron, USA
Dr. Aditi Taunk, University of Sydney
Dr. Mustafa F. Kocaeli University Istanbul, Turkey.
Dr. Atul A. More Sr. Scientist, Chemical Sciences Group Chemical Sciences & Technology Division CSIR-North East Institute of Science and Technology (NEIST Jorhat, Assam.
Dr. Prakash Chandra, Bundelkhand University, Jhansi 28401 28, U.P. India
Dr. Amith Varale, Devrukh Shikshan Prasarak Mandal's Nya. Tatyasaheb Athalye Arts, Ved. S.R. Sapre Commerce and Vid. Dadasaheb Pitre Science College (Autonomous) Devrukh, Dist: Ratnagiri-Maharashtra
Dr. Rajendra P. Patil, M.H Shinde College, Tisangi, Kolhapur, Maharashtra India
Prof. Sagar D. Delekar, Director, Innovation, Incubation and Linkages , & IQAC, Shivaji University, Kolhapur
Dr. Dattatray Patil, D. E. Society's Kirti M. Doongursee College of Arts Science and Commerce, Dadar (W) Mumbai
Dr. Harishchandra Parbat, HOD Chemistry, Wilson College, Mumbai
Dr. Bhagwan V. Jadhav, C.K.T. College, New Panvel, Maharashtra, India
Dr. Shrikrishna Tupare Professor, AP Science College, Nagothane-Raigad
Dr. Bhushan B. Khairnar, Interdisciplinary School of Science (IDSS), Savitribai Phule Pune University. Maharashtra.
Dr. Jagdish Thakur, Doshi Vakil Arts College and G.C.U.B. Science & Commerce College

ABOUT THE CONFERENCE

The International Conference on Emerging Trends in Chemical Sciences: Innovation Beyond Boundaries aims to bring together researchers, academicians, industry experts, and students from around the world to discuss the latest advancements in chemical sciences. The conference focuses on innovative research, interdisciplinary approaches, and modern technologies that contribute to solving global challenges. It encourages knowledge exchange, collaboration, and the development of new ideas in areas such as organic, inorganic, physical chemistry, materials science, nanotechnology, green chemistry, and industrial chemistry.

SUB THEME OF THE CONFERENCE

Eco-friendly chemical processes	**Green solvents and catalysis**	**Waste minimization and circular chemistry**
Renewable feedstocks and bio-based chemicals	**Nanomaterials and nanocomposites**	**Polymers and biomaterials**
Materials for energy and environmental applications	**Drug design and discovery**	**Heterocyclic compounds in medicine**
Natural products and bioactive molecules	**Pharmaceutical analysis and quality control**	**Novel synthetic methodologies**
Organometallic and homogeneous catalysis	**Reaction mechanisms and synthetic strategy**	**Metal complexes and their applications**
Supramolecular chemistry	**Quantum chemistry and spectroscopy**	**Chemical kinetics and thermodynamics**
Climate change and atmospheric reactions	**Fuel cells and hydrogen energy**	**Biomolecular interactions**
Chemical approaches in life sciences	**Food quality and safety analysis**	**Phytochemistry and herbal products**
Agrochemicals and sustainable agriculture	**Chemistry in forensic science**	**Chemistry for healthcare innovation**

PROGRAM SCHEDULE

Time	Event
8.30 am to 9.30 am	Registration and Breakfast
9.30 am to 10.15 am	Invited Talk 1 by Dr. Mukund Tantak
10:15 am to 11.00 am	Inauguration Function by Chief Guest Dr. Baliram Gaikwad
11.00 am to 11.40 am	Keynote Address by Dr. Vishwanath Patil
11.40 am to 12.20 pm	Invited Talk 2 by Dr. Sanjay Sonawale
12.20 pm to 1.10 pm	Invited Talk 3 by Dr. M. A. Badgujar
1.10 pm to 2.00 pm	Lunch Break
2.00 pm to 3.30 pm	Oral Presentation (Online / Offline)
3.30 pm	Valedictory Function

।। शील परं भूषणम् ।।

दूरध्वनी क्र. २६३९२८

माणगांव शिक्षण प्रसारक मंडळ

माणगांव - रायगड.

संस्था नोंदणी क्र. एफ – २७

र.नं. Bom 7 / 1958 KBL Dated 7-11-1958

अध्यक्ष :- ॲड. राजीव साबळे Mob. 9323323323

E-mail :- mspm@gmail.com / mspmmangaonseniorcollege@gmail.com / khamkarbm@gmail.com

President Message

The late Ashok Dada Sable established D. G. Tatkare Mahavidyalaya in 1993 with the sole intention of providing education to youngsters in rural areas in order to improve society. The sacred task of education has been carried out since its founding. The college received a grade B^+ (second cycle CGPA 2.64) and was reaccredited by NAAC. Six UG and six PG programs are offered by the college, which is connected to the University of Mumbai.

It is truly a delight to learn that D. G. Tatkare Mahavidyalaya, Mangaon Raigad in collaboration with Anjuman Islam Janjira Degree College of Science, Murud Janjira, Veer Wajekar Arts, Science & Commerce College, Phunde, G. M. Vedak College of Science, Tala Raigad, Bhausaheb Nene Arts, Commerce & Science College, Pen and Dr. Babasaheb Ambedkar College of ASC, Mahad is taking the initiative to host the International conference on "**Emerging Trends in Chemical Science: Innovation Beyond Boundaries"** on 11th April 2026 and is producing a souvenir to commemorate the event.

As the president and on behalf of the Executive Council & entire College Development Committee, we are extremely proud of the cooperation between these six organizations in planning this important event. We hope that this conference will encourage students, aspiring researchers, and young scientists to follow their dreams in the future. This conference will provide instructors and students from both universities with important insights. We would like to express our gratitude to the team that helped to organize the event and wish them the best of luck for the conference.

Adv. Rajiv Ashok Sable

President

Accredited by NAAC with Grade-B-2.17(2014) B+ - 2.64 (2022) Permanently Affiliated to University of Mumbai

Mangaon Shikshan Prasarak Mandal's

D. G. Tatkare Mahavidyalay

Arts, Science, Commerce.

Tal. Mangaon, Dist. Raigad. 402 104

Off. 02140 - 263928,

Mob. : 9075610653

Estt. 14th July 1993
Reg. No. 3664/93

Dr. Baban M. Khamkar
Principal

Late Ashokdada Sable
Founder - (Ex. M. L. A.)

Shri. Rajiv Sable
President

Shri. Krishna Gandhi
Secretary

Website :- www.mangaonseniorcollege.com E-mail :- mspmmangaonseniorcollege@gmail.com

Principal Message

It is truly a delight to learn that D. G. Tatkare Mahavidyalaya, Mangaon Raigad in collaboration with Anjuman Islam Janjira Degree College of Science, Murud Janjira, Veer Wajekar Arts, Science & Commerce College, Phunde, G. M. Vedak College of Science, Tala Raigad, Bhausaheb Nene Arts, Commerce & Science College, Pen and Dr. Babasaheb Ambedkar College of ASC, Mahad is taking the initiative to host the International conference on "**Emerging Trends in Chemical Science: Innovation Beyond Boundaries"** on 11th April 2026 and is producing a souvenir to commemorate the event.

This conference aims to highlight the most recent advancements in science and technology. Right now, we live in an innovative era. Extensive research, which is now an essential component of higher education, leads to innovations. The growth of humanity and the health of our environment are greatly aided by scientific and technological research. For upcoming scientists, this conference is essential as it promotes research projects. By planning such an event, a forum is established for novice researchers and seasoned professionals to exchange viewpoints and participate in insightful conversations, thereby promoting high-caliber research.

I extend my warm wishes to all delegates, participants and students to this conference and wishing best luck for further discussion.

Dr. B. M. Khamkar

Principal

॥ नहि ज्ञानेन सदृशं पवित्रमिह विद्यते ॥

☎ 02143 - 253262 / 299262

पेण एज्युकेशन सोसायटी पेण, जि. रायगड

Pen Education Society, Pen, Dist. Raigad

Estd. 1910

Registered under Society's Registration Act of 1860 Regd. No. 037/359 dt. 2nd August 1929
and under Mumbai Public Trust Act. of 1950 F-4-Kolaba dt.8th April 1953

Adv. M. V. Nene	Shri. P J. Oak	Shri. S. B. Kadu	Shri. S. R. Joshi
President	*Chairman*	*Vice Chairman & Treasurer*	*Hon. Secretary*
✆ 9975007600	✆ 9822422676	✆ 9209560390	✆ 9422690887

Outward No. **Date :**

Message..

----Adv. Mangesh Nene

D. G. Tatkare Mahavidyalaya is One of the reputed college in the Mangoan Taluka. It's primarily catering education to rural students especially girls. The most required opportunity for students from rural background is education. The D. G . Tatkare Mahavidyalaya under the able Leadership of Shree Rajivji Sable and his team is doing excellent work. Through this upcoming conference on " Emerging Trends in Chemical Science: Innovation Beyond Boundaries". I am really greatful to the Management and whole team for this conference which is to be conducted with Anjuman Islam Janjira Degree college of science, Murud Janjira, Veer Wajekar Arts, Science and Commerce college Phunde, G M Vedak College of Science Tala , Bhausahab Nene Arts Science and Commerce College Pen and Dr. Babasaheb Ambedkar College Mahad on 11th April 2026 . This conference will be helpful in discussing problems in chemical science and may suggest useful solutions. The deliberations in this conference may lead to better environmental solutions and will ease the life of the common man.

I wish this conference every success. I am happy to be associated with it.

Wishing all concerned participants and organizers good luck.

Yours truly

Adv. Mangesh Nene

Accredited by NAAC with 'B' grade
(with a CGPA of 2.22)
Pen Education Society's
BHAUSAHEB NENE
ARTS, SCIENCE AND COMMERCE COLLEGE, PEN
Dist. Raigad 402107
(Permanently Affiliated to University of Mumbai)
(Listed under 2f & 12b of UGC)
पेण एज्युकेशन सोसायटीचे
भाऊसाहेब नेने
कला, विज्ञान आणि वाणिज्य महाविद्यालय, पेण
जि. रायगड ४०२ १०७.
(मुंबई विद्यापिठाशी कायम सलग्न)
(यूजीसीच्या २(एफ्) व १२(बी) मान्यताप्राप्त)
Estd.1990
Principal : Dr. S. B. Dharap, M.Sc., Ph.D.,LL.B.

Outword / /2026-2027 Date:04/04/2026

Message from Principal

-- Dr.Sadanand Bhaskar Dharap

It's a really great pleasure to be co-host with the DG. Tatkare Mahavidyalaya for upcoming conference on " Emerging Trends in Chemical Science: Innovation Beyond Boundaries". I am really greatful to the Management and whole team for this conference which is to be conducted with Anjuman Islam Janjira Degree college of science, Murud Janjira, Veer Wajekar Arts, Science and Commerce college Phunde, G M Vedak College of Science Tala , Bhausahab Nene Arts Science and Commerce College Pen and Dr. Babasaheb Ambedkar College Mahad on 11th April 2026 . This conference will be helpful in discussing problems in chemical science and may suggest useful solutions. The deliberations in this conference may lead to better environmental solutions and will ease the life of the common man.

I wish this conference every success.

Wishing all concerned participants and organizers good luck.

Yours truly

Prin. Dr. Sadanand Bhaskar Dharap

Ph.(02143) 252496 • E-mail: pesbnasc@yahoo.co.in • website : www.pesbncollege.org.in

Anjuman Islam Janjira
Established in 1907

ANJUMAN ISLAM JANJIRA DEGREE COLLEGE OF SCIENCE

Janjira Murud, Dist. Raigad, Pin.402401
(Affiliated to University of Mumbai)
ISO 9001:2015 (Quality Management Systems)
E-mail: aijcollege@gmail.com Website: www.aijdegreecollege.edu.in
Phone. 7038601376/ 9270083578

NAAC
Re-Accredited With
2.69 CGPA
B+ Grade

Best College Award2019-20
By Jolly Club- Raigad

Ref. No. AIJDCM/ 4303/2026 **Date:** 02/04/2026

Chairman's Message

I am delighted to extend my warm greetings on the **One Day International Conference on "Emerging Trends in Chemical Science: Innovation Beyond Boundaries."**

Anjuman Islam Janjira Degree College of Science, Murud-Janjira, Raigad, is committed to providing quality education and promoting academic excellence for the socio-economic development of society. The college successfully completed its Second Cycle of NAAC Accreditation with a 'B+' Grade (CGPA 2.69), reflecting the dedicated efforts of its faculty, staff, and management.

The institution presently offers undergraduate programmes in Chemistry, Botany, Computer Science, and Management, and has further strengthened its academic portfolio by introducing postgraduate programmes in M.Sc. Chemistry and M.Sc. Botany. These initiatives underline the college's commitment to advancing higher education, promoting research culture, and encouraging scientific inquiry among students and faculty members.

In alignment with this academic vision, the Department of Chemistry of **MSPM's D. G. Tatkare Mahavidyalaya, Mangaon**, in collaboration with **Anjuman Islam Janjira Degree College of Science, Murud-Janjira, Rayat Shikshan Sanstha's Veer Wajekar Arts, Science & Commerce College, Uran, G. M. Vedak College of Science, Tala, Bhausaheb Nene Arts, Commerce and Science College, Pen**, and **Dr. Babasaheb Ambedkar College of Arts, Science and Commerce, Mahad**, is organizing a **One Day International Conference on "Emerging Trends in Chemical Science: Innovation Beyond Boundaries" on 11th April 2026 at MSPM's D. G. Tatkare Mahavidyalaya, Mangaon, Raigad.**

This conference provides an interdisciplinary platform for researchers, academicians, industry experts, and students to share recent advances and innovative research in chemical sciences. It promotes knowledge exchange, collaboration, and meaningful discussions, while keynote lectures and research presentations contribute to the advancement of scientific knowledge.

On this auspicious occasion, I sincerely appreciate the efforts of the Conference Organizing Committee, faculty members, staff, and all contributors whose dedication has made this event possible. I extend my best wishes for the grand success of this International Conference and trust that it will achieve its academic and research objectives.

Anjuman Islam Janjira Degree College of Science
Janjira Murud, Dist. Raigad, Pin.402401
(Affiliated to University of Mumbai)
ISO 9001:2015 (Quality Management Systems)
E-mail: aijcollege@gmail.com Website: www.aijdegreecollege.edu.in
Phone. 7038601376/ 9270083578

Anjuman Islam Janjira Degree College of Science JANJIRA MURUD

CHAIRMAN
ANJUMAN ISLAM JANJIRA
DEGREE COLLEGE OF SCIENCE
JANJIRA MURUD DIST. RAIGAD

Chairman
Anjuman Islam Janjira Degree College of Science

ANJUMAN ISLAM JANJIRA
DEGREE COLLEGE OF SCIENCE

Janjira Murud, Dist. Raigad, Pin.402401
(Affiliated to University of Mumbai)
ISO 9001:2015 (Quality Management Systems)
E-mail: aijcollege@gmail.com Website: www.aijdegreecollege.edu.in
Phone. 7038601376/ 9270083578

Anjuman Islam Janjira
Established in 1907

NAAC
Re-Accredited With
2.69 CGPA
B+ Grade

Best College
Award2019-20
By Jolly Club- Raigad

Chief Patron
SIR. SIDDI AHMED KHAN

HIFZURREHMAN NAZIR
Secretary

ALTAF H MALIK
Treasurer

AZIM KHANZADA
Murud Halqa
President

S. ZAINUDDIN KADIRI
CDC Chairman

Dr. SAJID SHAIKH
I/C Principal

Ref. No. AIJDCM/ 4302/2026 **Date:** 02/04/2026

Principal's Message

It gives me great pleasure to welcome you all to the **One Day International Conference on "Emerging Trends in Chemical Science: Innovation Beyond Boundaries"**, scheduled to be held on **11th April 2026 at MSPM's D. G. Tatkare Mahavidyalaya, Mangaon, Raigad**.

This prestigious international conference is jointly organized by the **Department of Chemistry, MSPM's D. G. Tatkare Mahavidyalaya, Mangaon**, in collaboration with **Anjuman Islam Janjira Degree College of Science, Murud-Janjira; Rayat Shikshan Sanstha's Veer Wajekar Arts, Science & Commerce College, Phunde-Uran; Shri G. M. Vedak College of Science, Tala; Bhausaheb Nene Arts, Commerce and Science College, Pen; and Dr. Babasaheb Ambedkar College of Arts, Science and Commerce, Mahad**. The conference aims to provide a dynamic platform for academicians, researchers, scientists, industry experts, and students to exchange innovative ideas, share research outcomes, and deliberate on emerging developments in the field of chemical sciences.

In today's rapidly evolving scientific landscape, interdisciplinary research and collaboration play a crucial role in addressing global challenges. This conference is an earnest effort to promote research culture, academic excellence, and meaningful interaction among scholars working in various domains of chemical sciences and related interdisciplinary areas.

I am confident that the deliberations, keynote lectures, invited talks, and research presentations during this conference will be intellectually stimulating and will contribute significantly to knowledge enhancement and scientific advancement.

I extend my sincere appreciation to the organizing committee for their dedicated efforts and wish the conference a grand success. I warmly welcome all the participants and wish them a fruitful, enriching, and memorable conference experience.

With best wishes,

Dr. Sajid F. Shaikh
I/C Principal
Anjuman Islam Janjira Degree College of Science

Anjuman Islam Janjira Degree College of Science ★ JANJIRA MURUD

I/C PRINCIPAL
Anjuman Islam Janjira
Degree College of Science
Janjira Murud, Dist. Raigad

Shri Gopinath Mahadeo Vedak Pratishthan
(Reg.No.E-3094/22.6.2000)
410, Morya Shalimar Park, Andheri Link Road, Andheri (W), Mumbai- 400053
Tel: 022 26736313/ 022 26736314, 9819433501
Tala Office Tel: 02140 297397

President Message

It gives me great pleasure to share a few words on this special occasion. G. M. Vedak College of Science, Tala, has always been committed to providing quality education to students from rural areas and helping them build a strong academic and professional future. The college offers a range of undergraduate (Chemistry, Physics, Zoology, Computer Science, Information Technology and postgraduate programs (Organic Chemistry and Information Technology), along with a recognized Ph.D. research centre in Chemistry, encouraging innovation and advanced scientific research.

In today's rapidly evolving scientific world, collaborative work plays a crucial role in the development of meaningful and impactful research. When institutions come together, they bring diverse ideas, expertise, and perspectives that lead to innovation and stronger outcomes.

I am happy to know that our college, in collaboration with esteemed institutions, is organizing the International Conference on "Emerging Trends in Chemical Science: Innovation Beyond Boundaries" on 11th April 2026. Such initiatives provide an excellent platform for students, researchers, and academicians to exchange ideas and explore new developments in science.

I sincerely appreciate the efforts of all organizers and participants. I am confident that this conference will inspire young minds and contribute significantly to the advancement of chemical science.

Best wishes for the success of the conference.

Dr. Nandkumar Vedak
President
Shri. Gopinath Mahadeo Vedak Pratishthan

Shri. Gopinath Mahadeo Vedak Pratishthan's
G.M.VEDAK COLLEGE OF SCIENCE
(Affiliated to University of Mumbai)
Reaccredited "B" Grade by NAAC
At & Post - Tala, Taluka – Tala, Dist – Raigad, 402 111.
TEL: 02140297397. Email: gmvtala@ymail.com, gmvcstala@gmail.com, Website: www.gmvcs.org.in

Principal Massage

It gives me immense pleasure to extend a warm and cordial welcome to all the distinguished dignitaries, eminent researchers, academicians, and participants to the **One Day International Conference on "Emerging Trends in Chemical Science: Innovation Beyond Boundaries" scheduled on 11th April 2026**.

I feel deeply honoured and privileged to serve as the In-Charge Principal of G. M. Vedak College of Science, Tala–Raigad an institution where academic excellence harmoniously blends with holistic development. I would like to express my sincere gratitude to the Shri. Gopinath Mahadeo Vedak Pratishthan for entrusting me with this responsibility.

I am also proud to mention that our institution has been reaccredited with a 'B' Grade by NAAC in 2025, which stands as a testament to our continuous efforts toward maintaining quality in higher education and institutional development.

This conference, jointly organized by Mangaon Shikshan Prasarak Mandal's D. G. Tatkare Mahavidyalay (Department of Chemistry) in collaboration with esteemed institutions, reflects our collective commitment to advancing scientific knowledge and fostering academic collaboration. It provides an excellent platform for intellectual exchange, innovative thinking, and interdisciplinary dialogue in the ever-evolving field of Chemical Sciences.

At our institution, we strongly believe that education is the most powerful medium for transforming individuals and society. Our mission is to nurture knowledge, skills, and ethical values that empower students to become competent professionals, responsible citizens, and visionary leaders in a global context.

The theme of this conference is highly relevant in today's rapidly advancing scientific landscape. It encourages exploration beyond traditional boundaries and promotes innovation-driven research. I am confident that the deliberations and discussions during this conference will inspire new ideas, foster meaningful collaborations, and contribute significantly to the scientific community. I extend my best wishes to all the participants for a fruitful and enriching experience. I also congratulate the organizing committee for their dedicated efforts in making this conference a grand success.

Let us move forward together with a spirit of inquiry, integrity, and innovation to create a better and sustainable future.

Dr. Sachin V. Bangale
In-Charge Principal
G. M. Vedak College of Science, Tala, Raigad

RAYAT SHIKSHAN SANSTHA'S

VEER WAJEKAR ARTS, SCIENCE & COMMERCE COLLEGE, PHUNDE

NAAC ACREDITED 'B++'(CGPA-2.99)
c Principal Dr. Thakkar A. N.
.Sc, Ph.D.

"Best College Award"- Mumbai University
Estd : June 1989

Ref. No. : VWC/2026 - 27
Date : 06/04/2026

Principal's Message

It gives me immense pleasure to extend my warm greetings on the occasion of the **One Day International Conference on "Emerging Trends in Chemical Science: Innovation Beyond Boundaries"** scheduled on 11th April 2026. I congratulate MSPM's D. G. Tatkare College, Mangaon, and all collaborating institutions for jointly organizing this significant academic event.

In today's rapidly evolving scientific landscape, chemistry plays a pivotal role in addressing global challenges related to sustainability, health, energy, and the environment. The themes of this conference—ranging from green solvents and catalysis, waste minimization and circular chemistry, renewable feedstocks, nanomaterials, polymers, and biomaterials, to drug design, pharmaceutical analysis, and novel synthetic methodologies—are highly relevant and aligned with current scientific and industrial needs.

Such collaborative platforms not only promote academic excellence but also foster innovation, interdisciplinary research, and knowledge exchange among students, researchers, and academicians. I am confident that this conference will provide valuable insights into emerging trends and inspire young minds to contribute meaningfully to the advancement of chemical sciences.

I appreciate the efforts of the organizing committee, faculty members, and participants for their dedication and commitment. I wish the conference great success and hope it will pave the way for future scientific collaborations and breakthroughs.

Best wishes to all participants for a fruitful and enriching experience.

Dr. Aamod N. Thakkar
I/c Principal
Veer Wajekar A.S.C. College,
Phunde, Tal. Uran, Dist. Raigad.

Mahalan Vibhag, Phunde, Tal. Uran, Dist. Raigad, JNPA, Navi Mumbai. 400 702
No. : NGC - 1589 (1855) Vs - II, Telefax : 022 - 27221035, Mob.: +91 9322891200
Email : office_phunde@yahoo.com • phundecollege@gmail.com • www.veervajekarascc.edu.in

PEOPLE'S EDUCATION SOCIETY

(Estd 8th July 1945)

Registered Under the Society's Registration Act. 1860 (No. 1375 of 1945 - 46) & the Bombay Public Trust Act 1950 (No. F - 303 Bom)

Founder : Bharat Ratna DR. B. R. AMBEDKAR

(M.A., Ph.D., D.Sc. (London), LL.D. (Columbia), D. Litt. (OSM), Bar-at-Law)

348, Anand Bhavan, Dr. D. N. Road, Fort, Mumbai - 400 001. Tel.: 022 2204 4909 E-mail : pesofficial1945@gmail.com

Website : www.peopleseducationsociety.in

Ref. No. PES. / / 20 -20 Date :

President Message

The Bharat Ratna Dr. Babasaheb Ambedkar established People's Education Society's, Mumbai. This society's one of the branch at Mahad that is Dr.Babasabeb Ambedkar College Of ASC, Mahad, Raigad. Established in 1961 with the sole intention of providing education to youngsters in rural areas in order to improve society. The sacred task of education has been carried out since its founding. The college received a grade ` B+` and was reaccredited by NAAC. Arts, Commerce ,Science, Management,Computer Science and Informational technology faculties UG programmes run in college and PG programs in Chemistry, Commerce, Botany and Marathi are offered by the college, which is affiliated to the University of Mumbai.

It is truly a delight to learn that Dr.Babasabeb Ambedkar College, of ASC, Mahad , Raigad in collaboration with D.G. Tatkare college, Mangaon, Raigad, Anjuman Islam Janjira Degree College of Science, Murud Janjira, Veer Wajekar Arts, Science & Commerce College, Phunde, G. M. Vedak College of Science, Tala Raigad and Bhausaheb Nene Arts, Commerce & Science College, Pen and is taking the initiative to host the International conference on "Emerging Trends in Chemical Science: Innovation Beyond Boundaries on 11th April 2026 and is producing a souvenir to commemorate the event.

As the president and on behalf of the Executive Council & entire College Development Committee, we are extremely proud of the cooperation between these six organizations in planning this important event. We hope that this conference will encourage students, aspiring researchers, and young scientists to follow their dreams in the future. This conference will provide instructors and students from both universities with important insights. We would like to express our gratitude to the team that helped to organize the event and wish them the best of luck for the conference.

H'ble Mr. Ramdasji Athawale.
President
People's education ssociety, Mumbai.

People's Education Society, Mumbai

DR. BABASAHEB AMBEDKAR COLLEGE

OF ARTS, SCIENCE & COMMERCE MAHAD, Dist.: Raigad, Pin : 402 301

FOUNDER : Bharat Ratna Dr.B.R.Ambedkar

M.A., Ph.D., D.Sc.(London), LL.D. (Columbia), D.Litt. (Osmania), Bar at Law

Chairman : Dr. Ramdas Athawale (Minister of State for Social Justice &Empowerment, Govt. of India)

● Dy.Chairman ●
Padmashree Prof. Dr. Sukhdeo Thorat
(B.A. LL.B. DJPR) Former UGC Chairman

● Secretary ●
Dr. Wasudev Gadhe
(Ex. VC Pune University)

● Incharge Principal ●
Dr.Yogesh Pramila Prabhakar Borale
(M.A.,SET, Ph.D)

☎ (OFFICE) 222148, (Principal) 222169, FAX (02145) 222169,Website: bacmahad.org, Email:drbaccollegemahad@gmail.com

NAAC Re-accredited with B+ Grade (CGPA2.72) | ISO Certified 9001:2015 | Best College Award 2015-16 (Univerisity of Mumbai)

Principal Message

It is truly a delight to learn that Dr. Babasaheb Ambedkar College Of ASC, Mahad, Raigad in collaboration with D. G. Tatkare Mahavidyalay, Mangaon Raigad ,Anjuman Islam Janjira Degree College of Science. Murud Janjira. Veer Wajekar Arts, Science & Commerce College, Phunde, G. M. Vedak College of Science, Tala Raigad, Bhausaheb Nene Arts, Commerce & Science College, Pen and Dr. Babasaheb Ambedkar College of ASC, Mahad is taking the initiative to host the International conference on "**Emerging Trends in Chemical Science: Innovation Beyond Boundaries** "on **11th April 2026** and is producing a souvenir to commemorate the event.

This conference aims to highlight the most recent advancements in science and technology. Right now, we live in an innovative era. Extensive research, which is now an essential component of higher education, Leads to innovations. The growth of humanity and the health of our environment are greatly aided by scientific and technological research. For upcoming scientists, this conference is essential as it promotes research projects. By planning such an event, a forum is established for notice researchers and seasoned professionals to exchange viewpoints and participate in insightful conversations, hereby promoting high-caliber research.

I extend my warm wishes to all delegates, participants and students to this conference and wishing best luck for further discussion.

Dr. Yogesh Pramila Prabhakar Borale.
Incharge Principal,
Dr. Babasaheb Ambedkar College of ASC,
Mahad. Dist. Raigad. 402301

Organizing Committee Message

We are delighted to have you all join us on April 11, 2026, for the international conference on Emerging Trends in Chemical Science: Innovation Beyond Boundaries. We are thrilled that this Institute is bringing together eminent scientists, researchers, and aspiring researchers for this conference. We believe that this endeavor will examine recent innovations and offer fresh perspectives for the field's study. On behalf of the organizing committee, we would like to express our gratitude and extend a warm welcome to all of the distinguished scientists from many fields of chemical science, as well as research students and faculty members from various national and international institutions. We also like to express our gratitude to the principal of this institution and the College Development Committee for their unwavering support.

INDEX

Transition Metal-Catalyzed Synthesis of Heterocyclic Compounds: Recent Advances and Sustainable Approaches

Ms. Sayali Anand Kamble[1], Mr. Aditya Khanna[1], Dr. Bhushan P. Langi[*1], Satish Pradhan[1]

[1]Dnyanasadhana college Thane

Abstract: Heterocyclic compounds constitute a fundamental class of molecules with extensive applications in pharmaceuticals, materials science, and organic synthesis. Recent advancements in this field have been largely driven by the development of efficient and sustainable catalytic systems. Transition metal-catalyzed methodologies, particularly cyclization and multi-component reactions, have emerged as powerful tools for the construction of structurally diverse heterocycles with high selectivity and functional group tolerance. The integration of supported metal catalysts has gained considerable attention due to their advantages in terms of recyclability, ease of separation, and compliance with green chemistry principles.Furthermore, nanostructured materials such as metal/metal oxide-decorated carbon nanotubes have demonstrated enhanced catalytic activity and reusability owing to their unique physicochemical properties. In parallel, the design of advanced ligand systems, including N-heterocyclic carbene (NHC) and pincer complexes, has significantly improved catalyst stability and efficiency in key transformations such as cross-coupling, dehydrogenation, and direct arylation reactions. Emphasis on environmentally benign approaches, including aqueous and solvent-free systems, further highlights the shift toward sustainable synthesis. Overall, these developments provide a robust platform for the efficient and green synthesis of heterocyclic compounds.

Keywords: Nano catalysis, Pincer complexes, Sustainable synthesis, N-heterocyclic carbene (NHC), Green Chemistry

Spinel $CuAl_2O_4$ synthesis, study, and characterization for Ammonia gas sensing applications

Reshma D. Prakshale*[1], Sachin V. Bangale[2], Sanjay B. Sonawale[1]

[1]*D. E. Society's Kirti M. Doongursee College of Arts Science and Commerce, Dadar West Mumbai, Maharashtra, 400028, India.*

[2]*Chemical Research Lab, UG and PG Department of Chemistry, G. M. Vedak College of Science, Tala-Raigad, Maharashtra, 40211, India.*

Abstract: Nanocrystalline spinel structured $CuAl_2O_4$ was synthesized by a solution combustion method using a urea as fuel. The solution combustion process is a convenient, chief, environment friendly, and capable for the synthesis of quality nanomaterials. The prepared material was annealed to the temperature of 800^oC for four hours in an air. The structural, optical, morphological, compositional, magnetic, thermal and electrical properties of annealed nanocrystalline $CuAl_2O_4$ powder have been studied in detail. The sensor was constructed from nanocrystalline $CuAl_2O_4$powder and their gas detection properties were examined for ethanol, ammonia, acetone, hydrogen, LPG and carbon dioxide. The gas sensing measurements showed that, the $CuAl_2O_4$ material responds differently to the gases at different temperatures and it exhibits high sensitivity, good selectivity, rapid response and recovery capability for the ammonia gas compared to other test gases. The probable ammonia gas sensing mechanism is schematically represented in this paper. This study provides, $CuAl_2O_4$ synthesized using solution combustion method has a huge potential in future gas sensing fields.

Keyword: Solution combustion method, XRD, TEM, $CoFe_2O_4$ nanoparticles, Gas sensor.

A Review on Solvent-Based Comparative Phytochemical Profiling of Moringa Oleifera Leaves

Tasmeena Inayatullah Harge*[1], Asst. Prof. Tahsin Rawoot[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: *Moringa oleifera* leaf has attracted considerable scientific attention due to its rich reservoir of bioactive phytochemicals and diverse therapeutic potential. This review focuses on the comparative phytochemical analysis of *Moringa oleifera* leaf extracts obtained using solvents of different polarities, highlighting the critical role of solvent selection in extraction efficiency and phytoconstituent profiling. Solvents such as water (polar), ethanol (semi-polar), and hexane (non-polar) have been widely employed in extraction processes, each demonstrating varying capacities to solubilize specific classes of secondary metabolites. Evidence from multiple studies indicates that polar and semi-polar solvents, particularly aqueous and ethanolic extracts, exhibit higher concentrations of phenolics and flavonoids, which are strongly associated with antioxidant and pharmacological activities. In contrast, non-polar solvents like hexane are more effective in extracting lipophilic compounds, including certain terpenoids and sterols. Qualitative phytochemical screening consistently confirms the presence of major bioactive groups such as alkaloids, tannins, saponins, and glycosides across different extracts, although their abundance varies significantly with solvent polarity. Quantitative assessments, commonly performed using UV–Visible spectrophotometric methods, further substantiate these differences in total phenolic and flavonoid contents. Overall, this review underscores that solvent polarity is a decisive factor influencing the yield, composition, and biological relevance of *Moringa oleifera* leaf extracts. Optimizing extraction conditions based on targeted phytochemicals is therefore essential for enhancing their applicability in pharmaceutical, nutraceutical, and herbal product development, as well as for advancing future research on bioactive compound isolation and characterization.

***Keywords*:** *Moringa oleifera*, phytochemical analysis, solvent polarity, extraction efficiency, total phenolic content, total flavonoid content.

A Review on HPLC-Based Analysis of Active Pharmaceutical Ingredients in Expired and Unexpired Tablet Formulations

Kulsum Aslam Jummal[1], Ankita Mhaske[*1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: This literature review focuses on the evaluation of active pharmaceutical ingredient (API) stability in expired and unexpired tablet formulations of Albendazole, Azithromycin, and Paracetamol using High Performance Liquid Chromatography (HPLC). The objective of such studies is to assess changes in drug potency, chemical stability, and therapeutic effectiveness following the expiration period. Existing findings indicate that unexpired tablet formulations consistently comply with pharmacopeial standards, maintaining API concentrations within the acceptable range of 90–110%. In contrast, expired formulations exhibit a gradual decline in API content, suggesting ongoing chemical degradation. Among the drugs evaluated, Paracetamol demonstrates comparatively higher stability, with minimal reduction in potency beyond its expiration date. Conversely, Azithromycin and Albendazole show greater susceptibility to degradation, likely due to environmental influences such as temperature, humidity, and light exposure.HPLC is recognized as a reliable and precise analytical technique for the quantification of APIs and detection of degradation products. Overall, the reviewed evidence highlights the critical importance of expiration dates in ensuring drug safety and efficacy. Additionally, it contributes to a broader understanding of degradation patterns in commonly used pharmaceuticals and supports regulatory guidelines for proper storage and usage.

Keywords: Albendazole, Azithromycin, Paracetamol, Active Pharmaceutical Ingredient, Drug Stability, Drug Potency, HPLC.

A Comprehensive Review on Qualitative and Quantitative Analysis of Bioactive Compounds in Bryophyllum pinnatum (Miracle Leaf)

Hawabi F. Dhansay[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Bryophyllum pinnatum, commonly known as the Miracle Leaf, has been extensively studied due to its wide range of medicinal properties. Numerous studies highlight its traditional use in treating wounds, kidney stones, inflammation, and other health conditions. Research has primarily focused on the qualitative and quantitative analysis of its bioactive compounds to validate these therapeutic claims. Various extraction methods have been reported, among which cold maceration is widely preferred as it preserves thermolabile phytoconstituents. Different solvents such as aqueous, ethanol, and chloroform are commonly used, with ethanol frequently demonstrating higher extraction efficiency. This is attributed to its intermediate polarity, which enables better solubilization of diverse phytochemicals. Phytochemical screening across studies consistently confirms the presence of alkaloids, flavonoids, tannins, saponins, glycosides, phenols, and terpenoids. These compounds are associated with significant biological activities, including antioxidant, anti-inflammatory, and antimicrobial effects. Quantitative analysis is often carried out using UV–Visible spectrophotometry, particularly for estimating total phenolic and flavonoid content. Overall, the literature establishes Bryophyllum pinnatum as a potent source of bioactive compounds. It also emphasizes the importance of selecting appropriate extraction techniques and solvents to enhance yield and efficacy, thereby supporting its potential in developing plant-based therapeutic agents.

Keywords: Bryophyllum pinnatum, Bioactive compounds, Phytochemical analysis, Qualitative & quantitative analysis, UV-Visible spectroscopy, Medicinal plants.

A Comparative study of catalytic synthesis of psuedoionone from citral

Yusra J. Dakhawy[*1], Asst. Prof. Vishakha. V. Pawar [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Lemongrass (*cymbogopon citarus*) essential oil, renowned for its high citral content (geranial and neral isomers), has emerged as a sustainable renewable feedstock for pseudoionone synthesis through the classic aldol condensation with acetone. Traditional extraction methods such as hydrodistillation and steam-distillation from fresh or dried lemongrass leaves routinely yield citral-rich oils (>70–80% citral), as verified by gas chromatography and physicochemical profiling across numerous studies. The subsequent aldol condensation of citral with acetone has historically relied on homogeneous sodium hydroxide (NaOH) catalysis, which excels under mild conditions (20–55 °C, short reaction times) and delivers high pseudoionone yields. However, this approach generates substantial alkaline wastewater necessitating neutralization, posing environmental challenges. In response, heterogeneous magnesium oxide (MgO) catalysts have gained attention as recyclable solid bases, offering facile filtration, reduced waste, and comparable performance. Comparative evaluations reveal MgO to provide equivalent citral conversions and pseudoionone yields with superior selectivity and minimal by-product formation, aligning with green chemistry principles. This review underscores the integrated potential of lemongrass citral extraction coupled with NaOH and MgO-catalyzed aldol condensations, paving the way for efficient, waste-conscious production of pseudoionone a vital fragrance precursor.

Keywords: Lemongrass, Citral, Pseudoionone, Aldol condensation, Magnesium oxide (MgO) catalyst, heterogeneous catalysis, Green chemistry

A Review on The Effect of Cooking Methods on Vitamin C Retention in Vegetables and Analysis of Nutrients and Bioactive compounds using HPLC

Anisa Ismail Harge [*1], Asst. Prof. Tahsin Rawoot[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Vitamin C is an essential water-soluble vitamin that plays a vital role in human health, acting as an antioxidant, supporting immune function, and aiding in collagen synthesis. However, it is highly sensitive to heat, light, and oxygen, which can cause significant losses during cooking. This study aimed to evaluate the effect of different cooking methods—boiling, steaming, and frying on the vitamin C content of selected vegetables, including capsicum, cabbage, moringa leaves, spinach, potato, carrot, and brinjal. Fresh vegetable samples were collected, washed, and divided into raw and cooked portions. Cooking was performed using standardized household methods, and vitamin C content was determined using the redox titration method. Boiling was expected to cause the highest loss due to leaching into water, while steaming was anticipated to retain more vitamin C because of minimal water contact. Frying could result in moderate losses due to high temperatures. The study underscores the impact of common cooking practices on nutrient retention and highlights the importance of selecting appropriate methods to preserve vitamin C in vegetables, supporting healthier dietary choices. Additionally, High-Performance Liquid Chromatography (HPLC) was used to analyze bioactive compounds, including phenolics and flavonoids, in vegetable extracts prepared with methanol or ethanol. HPLC provides accurate, reliable results and allows comparison of nutrient composition across different vegetables. This analysis reinforces the nutritional value of a varied vegetable-rich diet, supporting health maintenance and chronic disease prevention. Overall, the study emphasizes both the significance of cooking methods and the utility of analytical techniques like HPLC in assessing food quality and nutrient retention.

Keywords: Vitamin C, Redox titration, Cooking methods, Nutrients, Bioactive compounds, Antioxidant, Phenolic compounds.

GC–MS-Based Characterization of Fatty Acid Composition in Commercial Ghee: A Comprehensive Review

Tushar D. Dhas[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Ghee is a widely consumed dairy product recognized for its nutritional, therapeutic, and culinary significance. The fatty acid composition of ghee plays a crucial role in determining its quality, oxidative stability, and potential health benefits. In recent years, **Gas Chromatography–Mass Spectrometry (GC–MS)** has emerged as a powerful and reliable analytical technique for the characterization of fatty acid profiles in dairy lipids. Typically, lipid samples are subjected to transesterification to convert triglycerides into fatty acid methyl esters (FAMEs), which enhances their volatility and facilitates accurate separation and identification. Numerous studies have reported that ghee contains a complex mixture of saturated, monounsaturated, and polyunsaturated fatty acids. Among these, palmitic acid, stearic acid, oleic acid, and linoleic acid are consistently identified as the major constituents. The relative abundance of these fatty acids can vary significantly depending on factors such as the source of milk, animal diet, geographical origin, and processing methods. Such variations directly influence the nutritional profile and functional properties of ghee. Furthermore, the ratio of saturated to unsaturated fatty acids is widely used as an important indicator for evaluating the nutritional quality of ghee. GC–MS-based fatty acid profiling has also been extensively applied in assessing product authenticity, detecting adulteration, and ensuring quality control in commercial samples. Overall, existing literature highlights that GC–MS provides a sensitive, accurate, and comprehensive approach for fatty acid characterization, making it an indispensable tool in dairy chemistry research.

Keywords: Ghee, GC–MS, Fatty Acid Composition, FAMEs, Transesterification, Saturated and Unsaturated Fatty Acids, Nutritional Quality.

A Comparative study of various methods for the synthesis of o-methyl eugenol via methylation reaction

Rayyan A. Rashid Firfire[*1], Asst. Prof. Mehreen M. Dawre [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The synthesis of o-methyl eugenol (methyl eugenol) from eugenol via O-methylation reactions has garnered significant attention in green chemistry literature, with conventional thermal, microwave-assisted, and light-assisted methods emerging as versatile strategies for sustainable production. Eugenol extraction from clove sources typically involves hydro distillation (70-90% yield), followed by purification through vacuum distillation or chromatography to attain analytical purity. Conventional thermal methylation employs dimethyl carbonate (DMC) with K_2CO_3 under reflux (140°C, 3 h), achieving 90-96% yields of methyl eugenol post-workup, supplanting toxic reagents like dimethyl sulfate for industrial viability. Microwave-assisted protocols enable rapid, solvent-free conversion using dimethyl sulfate, K_2CO_3 and alkali bases, phase-transfer catalyst (20-50 s irradiation), selectively affording methyl eugenol or its isoeugenol isomer via distillation purification. Light-assisted approaches, Dimethyl carbonate was used as a safer alternative to toxic methylation agents, along with mild bases and suitable catalysts to promote the reaction efficiently, offering mild alternatives adaptable to eugenol substrates. The final product was confirmed using analytical techniques such as IR, and NMR. This review synthesizes these methodologies, underscoring thermal processes for scalability, microwave for expedition, and photochemistry for eco-compatibility. Despite advances, dedicated reviews remain scarce, highlighting opportunities for optimized, catalyst-driven innovations in flavor-fragrance synthesis while adhering to green principles—reagent minimization, energy efficiency, and waste reduction—to meet pharmaceutical and perfumery demands.

Keywords: Eugenol, Steam Distillation, Clove Oil, Conventional Method, Microwave assisted, Dimethyl carbonate, O-Methyl eugenol.

Green Synthesis of Silver Nanoparticles Using Tulsi (Ocimum Sanctum) and Aloevera Leaf Extract and its Characterization.

Priyanka Prashant Amonkar[1], Pranay Subhash Bhokate[1], Kaustubh P. Risbud*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: This review explores the potential of green synthesis of silver nanoparticles (AgNPs) using Tulsi (Ocimum sanctum) and Aloe vera leaf extracts, highlighting the effectiveness and sustainability of using natural sources for nanoparticle production. The study showcases the eco-friendliness of using plant extracts for AgNP synthesis, aligning with the principles of green chemistry. The key findings indicate that Tulsi and Aloe vera extracts possess excellent reducing and stabilizing properties, making them ideal for green synthesis. The synthesized AgNPs exhibit notable antimicrobial and antioxidant activities, suggesting potential applications in medicine, healthcare, and consumer goods. The use of plant extracts offers several benefits, including the presence of natural reducing agents, biodegradability, low toxicity, and cost-effectiveness. The significance of this study lies in its contribution to environmentally friendly methods for nanoparticle manufacture. Green synthesis using plant extracts can be applied in various fields, including medicine, healthcare, energy, and environment. For instance, AgNPs can be used to develop antimicrobial coatings for medical devices, wound dressings, and water purification systems. This review provides an overview of current trends and future directions in green nanotechnology, emphasizing the importance of sustainable practices in nanoparticle synthesis. Future research should focus on scaling up green synthesis methods, understanding the mechanisms underlying AgNP synthesis, and exploring new applications in fields like energy, environment, and agriculture. The development of green synthesis methods for AgNPs can pave the way for innovative solutions to global challenges.

Keywords: Nanotechnology, Green synthesis, Sustainability.

Phytochemical Composition, Bioactive Constituents, and Therapeutic Potential of *Tulsi* (*Ocimum sanctum*): A Comprehensive Review

Kulsum Ab. Rehman Rawoot*[1], Asst. Prof. Mehreen M. Dawre[1]

[1] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104*

Abstract: *Tulsi* (*Ocimum sanctum*), commonly known as holy basil, is an important medicinal herb extensively utilized in traditional healthcare systems, particularly Ayurveda, owing to its diverse pharmacological properties. The therapeutic potential of tulsi is primarily attributed to its rich composition of phytochemicals, which possess significant biological activities. Major bioactive constituents identified in tulsi include eugenol, ursolic acid, rosmarinic acid, linalool, apigenin, and carvacrol. Eugenol, a phenolic compound, exhibits potent anti-inflammatory, analgesic, and antimicrobial activities, while ursolic acid demonstrates anti-cancer, hepatoprotective, and antioxidant properties. Rosmarinic acid contributes to antioxidant and anti-allergic functions by scavenging free radicals and reducing oxidative stress. Linalool, a terpene alcohol, provides characteristic aroma and exhibits sedative, anxiolytic, and antimicrobial effects. Additionally, apigenin and carvacrol possess notable anti-inflammatory, anticancer, antimicrobial, and antifungal activities. The synergistic interaction of these phytochemicals enhances the pharmacological significance of tulsi, contributing to its immunomodulatory, antidiabetic, cardioprotective, and adaptogenic effects. Due to the presence of these diverse bioactive compounds, tulsi has emerged as a promising natural source for therapeutic applications and drug development. Ongoing scientific research continues to investigate the molecular mechanisms underlying its medicinal properties and explore its potential integration into modern pharmaceutical formulations, thereby highlighting its significance in holistic healthcare and future medicinal advancements.

Keywords: Tulsi, Ocimum sanctum, phytochemicals, eugenol, ursolic acid, rosmarinic acid, medicinal plant

Comparative analysis of beetroot derived natural dye & azo based synthetic dye

Yash S. Avhad [*1], Asst. Prof. Vishakha V. Pawar [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: This research project presents a detailed comparative analysis of beetroot-derived natural dye from Beta vulgaris and azo-based synthetic dye (Sudan I) for textile dyeing applications on cotton and wool fabrics. Beetroot dye, rich in betacyanins (75-95%) like betanin, was extracted through boiling, blending, and straining processes, producing vibrant red hues stable at pH 3-7 and temperatures below 50°C, with a shelf life of up to a year at 30°C. In contrast, the synthetic azo dye was synthesized via diazotization of aniline with sodium nitrite in HCl, followed by coupling with 2-naphthol at 0-5°C, yielding an orange-red precipitate with expected mp around 100-120°C after recrystallization from ethanol. The study evaluates multiple performance metrics to bridge gaps in existing literature, where azo dyes dominate 70% of the global textile market due to superior fastness but pose severe environmental and health risks. Fastness tests (light via xenon arc ISO 105-B02, washing ISO 105-C06, rubbing ISO 105-X12, heat, and bleaching with hypochlorite/peroxide per AATCC standards) anticipate beetroot achieving grades 4-6 with mordants like alum, compared to azo's 6-8, sufficient for sustainable apparel and khadi. Toxicity assessments screen for carcinogenic aromatic amines (e.g., benzidine, IARC Group 1) absent in beetroot, alongside heavy metals and formaldehyde per REACH/Oeko-Tex, highlighting natural dye's hypoallergenic and antioxidant properties ideal for babywear and medical textiles. Environmental profiling quantifies beetroot's advantages: 80-90% reductions in COD/BOD from biodegradable effluents versus azo's persistent pollutants, leveraging India's 1+ million tons annual beet production (20-30% waste repurposed), aligning with circular economy and Maharashtra's zero-liquid discharge mandates in hubs like Roha. Durability tests (tensile strength, Martindale abrasion) and thermal stability via DSC predict comparable results, with beetroot excelling in biodegradability. Advanced analytics provide mechanistic insights: TLC (silica gel, EtOH:AcOH mobile phase) reveals betanin Rf values and purity; UV-Vis spectroscopy measures λ_max (~535 nm betanin vs. ~450 nm azo), molar absorptivity, and exhaustion isotherms (Langmuir model); FTIR identifies O-H stretches (3400 cm^{-1}) in betanin versus N=N (1400 cm^{-1}) in azo; pH correlations optimize dyebaths (ideal 4-7). Statistical rigor employs Mann-Whitney U for pairwise fastness/toxicity comparisons and ANOVA for multi-variable effects (dye-fabric interactions), with 18 replicates over 10 weeks. Limitations include lab-scale extraction sans ultrasound/HPLC, cotton/wool focus excluding polyester, and no full LCA, positioning this as foundational work. Expected outcomes validate beetroot as a viable, non-toxic alternative, reducing pollution, boosting farmer incomes, and supporting SDGs 12/14—paving greener paths for India's textile industry.

Keyword: SDGs 12/14, λ_max, COD/BOD, biodegradable effluents, ANOVA, dye-fabric interactions.

Green Synthesis of Metal and Metal Oxide Nanoparticle's Using Algal

Jaydeep Risbud [1], Rutuja panchal [1], Surbhi R Thakur*[1], Dr. Sachin Bangale*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: Green synthesis of nanoparticles represents an environmentally sustainable and cost-effective alternative to conventional chemical and physical synthesis methods. Among various biological sources, algae (both micro- and macroalgae) have emerged as promising "bio-nano factories" for the synthesis of metal and metal oxide nanoparticles due to their rich secondary metabolite composition, rapid growth rates, and ease of cultivation. This comprehensive review examines the mechanisms of algae-mediated biosynthesis of metallic nanoparticles (Au, Ag, Pt), metal oxide nanoparticles (ZnO, TiO_2, Fe3O4, CuO), and bimetallic nanoparticles, with detailed discussion of intracellular and extracellular synthesis pathways. The review synthesizes current knowledge on factors affecting nanoparticle synthesis including pH, temperature, metal salt concentration, and reaction time. Additionally, characterization techniques (UV-Vis spectroscopy, TEM, SEM, XRD, and FTIR) and biomedical applications including antimicrobial, anticancer, and photocatalytic activities are comprehensively evaluated. Current challenges in scale-up and commercialization are addressed, along with future perspectives for advancing this sustainable technology in pharmaceutical, environmental, and industrial applications.

Keywords: Algae, green synthesis, nanoparticles, biosynthesis, metallic nanoparticles, metal oxide nanoparticles.

A Review on Green Corrosion Inhibition of Mild Steel in Acidic Medium Using Azadirachta indica (Neem) Leaf Extract

Saniya Arun Tarlekar [*1], Asst. Prof. Pankaj S. Gaikwad[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: : Corrosion of mild steel iin acidic environments poses a significant challenge in various industrial operations such as acid pickling, descaling, and oil well acidification. The demand for environmentally safe and cost-effective corrosion inhibitors has led to increasing interest in green inhibitors derived from natural sources. This review focuses on the effectiveness of Azadirachta indica (Neem) leaf extract as a sustainable corrosion inhibitor for mild steel in acidic media. Neem leaves contain a variety of bioactive constituents, including alkaloids, flavonoids, tannins, saponins, and terpenoids, which play a crucial role in inhibiting corrosion through adsorption on the metal surface.The inhibition efficiency of Neem leaf extract is influenced by factors such as concentration, temperature, and exposure time. Generally, higher concentrations of the extract lead to increased inhibition efficiency, while elevated temperatures may reduce its effectiveness due to desorption. The adsorption process is often described by isotherm models such as Langmuir, indicating the formation of a protective monolayer film on the metal surface. Both physisorption and chemisorption mechanisms are involved in the corrosion inhibition process.Various experimental techniques, including weight loss measurements, electrochemical impedance spectroscopy (EIS), and potentiodynamic polarization studies, have been employed to evaluate the performance of Neem extract. Surface characterization methods further confirm the formation of a protective film. Owing to its biodegradability, non-toxicity, and economic feasibility, Neem leaf extract emerges as a promising green alternative for corrosion control. This review highlights recent developments, mechanisms, and industrial relevance of Neem-based corrosion inhibitors.

***Keywords*:** Green Corrosion inhibitor, Mild steel, Acidic Medium, Azadirachta indica, Neem leaf extract, Absorption Isotherm, Electrochemical Studies, Eco-friendly inhibitor, Corrosion inhibition mechanism.

DEVELOPMENT, MANUFACTURING, AND QUALITY EVALUATION OF IRON POLYMALTOSE API.

Sanjay A. Shigwan[*1], Asst. Prof. Pankaj Gaikwad [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Iron deficiency anaemia is one of the most common nutritional disorders worldwide, and Iron (III)-hydroxide polymaltose (Iron Polymaltose) is widely used as an effective and safe iron supplement. This project focuses on the development, synthesis, and quality evaluation of Iron Polymaltose active pharmaceutical ingredient (API) at the research and development (R&D) scale. The primary objective of this study was to establish a reliable, reproducible, and quality-compliant method for the preparation of Iron Polymaltose API while optimizing key process parameters. The synthesis of Iron Polymaltose involved a multi-step process starting with the preparation of the reaction mass using maltodextrin and purified water. A catalyst (Cat-P) was added, and the pH was adjusted using sodium hydroxide solution. Controlled oxidation was carried out using sodium hypochlorite at a specific temperature range. Ferric chloride solution was then added gradually to facilitate iron complex formation under controlled conditions. The process was further followed by alkalization, maturation, cooling, and acidification steps to achieve the desired product characteristics. Precipitation of the product was carried out using methanol and acetone, followed by vacuum filtration and washing to remove impurities. The product was reprocessed and subjected to final precipitation to improve purity. Drying was performed in a hot air oven until the water content met the required specifications. Critical process parameters such as temperature, pH, reaction time, and solvent ratios were carefully controlled throughout the process to ensure optimal yield and quality of the API. The final Iron Polymaltose API was evaluated for its physicochemical properties, including iron content, water content, pH, and solubility. Analytical techniques such as UV–Visible spectrophotometry were used for determining iron content, while Karl Fischer titration was used for measuring water content. The results indicated that the prepared API showed consistent quality and complied with expected standards. In conclusion, the study successfully demonstrated the synthesis and development of Iron Polymaltose API at the laboratory scale. It was observed that process parameters significantly influence the quality of the final product. The developed method proved to be reliable and reproducible, providing a strong foundation for future scale-up and industrial production. This project also enhanced understanding of pharmaceutical manufacturing processes and quality evaluation techniques.

Keywords: API, pH, Iron Polymaltose, Cat-P, UV–Visible, Karl Fischer titration, maltodextrin, sodium hydroxide

A Comprehensive study and Determination of heavy metals contamination in commonly used spices

Dipina D. Latke [*1], Asst. Prof. Shubham Yerunkar [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: This project focuses on the determination of heavy metal contamination in commonly used turmeric samples. Turmeric, being one of the most widely used spices in daily food preparation, may act as a potential source of heavy metal exposure due to environmental pollution, agricultural practices, and processing methods. Therefore, monitoring its safety is of significant importance. In this study. two different turmeric samples, namely organic and commercially available (non-organic), were selected for comparative analysis. The samples were subjected to acid digestion using nitric acid in order to break down the organic matrix and release the metal ions into solution. The digested samples were then filtered and diluted appropriately for further analysis. For the detection of heavy metals, dithizone reagent was employed, which forms colored complexes with certain heavy metals such as lead and cadmium. The intensity of the color formed was analyzed using a colorimeter by measuring the absorbance values at a suitable wavelength. The use of colorimetric analysis provided a simple, rapid, and cost-effective method for comparative evaluation. The results obtained indicated a noticeable difference in absorbance values between the two samples. The commercially available turmeric sample exhibited higher absorbance, suggesting a relatively higher presence of heavy metal contamination compared to the organic sample. This comparative study highlights the variation in contamination levels based on source and processing. In conclusion, the study emphasizes the importance of regular monitoring of heavy metals in food products, especially spices like turmeric, to ensure consumer safety. The method adopted in this project proves to be effective for preliminary analysis and can be further extended using advanced instrumental techniques for precise quantification.

Keywords: Heavy metals contamination, turmeric sample, Dithizone reagent, colorimeter, food safety, Acid digestion, nitric acid, absorbance value.

Preparation and identification of optimal formulation of Bioplastic

Gaurav Anant Pawar [*1], Asst. Prof. Urmila Khobragade [1]

[1] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon – Raigad, 402-104.*

Abstract: The increasing environmental concerns associated with non-biodegradable petroleum-based plastics have led to the development of eco-friendly alternatives such as bioplastics. The present study focuses on the preparation and evaluation of biodegradable bioplastic films using cornflour as the primary raw material. Cornflour, being rich in starch, serves as a natural polymer capable of forming films upon gelatinization.In this study, four different formulations (F1–F4) were prepared by varying the composition of glycerine, calcium carbonate, and okra mucilage. Glycerine was used as a plasticizer to improve flexibility, calcium carbonate as a filler to enhance rigidity, and okra mucilage as a natural polysaccharide-based additive to study its potential as an alternative to glycerine. The films were prepared using a simple solution casting method involving heating, tirring, and drying. The prepared bioplastic films were evaluated for physical properties such as thickness, flexibility, appearance, and water absorption. Moisture content and tensile strength were also studied using simple laboratory methods. Fourier Transform Infrared (FTIR) analysis was used to identify functional groups and to understand molecular interactions between the components. The results indicated that glycerine significantly improved flexibility but increased moisture absorption. Calcium carbonate contributed to increased rigidity and structural stability. Okra mucilage showed promising film-forming ability and demonstrated potential as a natural alternative to glycerine, although its effectiveness depended on concentration. Among the formulations, one composition showed a balanced combination of flexibility, strength, and stability, making it the optimal formulation. The study concludes that biodegradable bioplastic films can be successfully prepared from cornflour using natural additives. The use of okra mucilage highlights the potential of plant-based materials in developing sustainable and eco-friendly plastic alternatives**.**

Keywords: Bioplastic, Corn flour, Starch, Glycerin, Calcium Carbonate, Okra Mucilage, Plasticizer, Biodegradable, FTIR Analysis, Sustainable Materials.

A Comparative study and synthesis of pigment red 170

Kirti Balkrushna Bhosle [*1], Asst. Prof. Vishakha. V. Pawar [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract Research on the dynamics of crystal transformation can guide production practices and improve the coloration performance of pigment Red 170. As one of the most important azo dyes, the low hiding power, inferior weather resistance, thermal instability, and low flowability of pigment Red 170 limit its applications. To enhance these properties, it is essential to modify the surface of the pigment. Herein, the crystal transformation and isothermal crystallisation kinetics of colour index (C.I.) pigment Red 170 during a hydrothermal process were studied through X-ray powder diffraction. During isothermal crystallisation, the Avrami indexes (n) were 2.65 and 3.01, and the kinetic rate constants (K) were 6.02×10^{-6} and 8.34×10^{-6} at 140 and 150 °C, respectively. The apparent activation energies (E) are 10.42 and 24.31 kcal mol^{-1} for the incubation period and total transition, respectively. Pigment Red 170 completely transferred from an α-phase to γ-phase upon hydrothermal treatment at 140 and 150 °C for 180 and 90 min, respectively. The effects of heat treatment temperature and time on the colour hue, tinctorial strength, flowability, particle size and distribution, contact angle, thermal stability, , and morphology of pigment Red 170 were investigated. In addition, kaolin was used as an inorganic additive to modify γ-phase pigment Red 170. After hydrothermal treatment and kaolin modification, C.I. pigment Red 170 had a small particle size and exhibited a narrow size distribution and improved hydrophilicity. The γ-phase pigments had a tinctorial strength of 189.5%. The flowability and thermal stability of the kaolin-modified pigment were also enhanced. This study promotes the development of pigments with enhanced colour properties, thermal stability, and processability.

Keywords: pigment Red 170, Isothermal crystallization, γ-phase, Flowability, Particle size, Distribution

Physico-Chemical Characterization of River Water and Advances in Water Softening Techniques: A Comprehensive Review

Pranali S. Deshmukh[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Rivers are one of the most important sources of freshwater, supporting ecosystems, human consumption, agriculture, and industrial activities. However, increasing industrialization and urban development have significantly impacted river water quality. This review focuses on the physico-chemical characterization of river water and highlights recent advances in water softening techniques used to improve water quality. The quality of river water is determined by various physico-chemical parameters such as temperature, pH, turbidity, dissolved oxygen (DO), biochemical oxygen demand (BOD), chemical oxygen demand (COD), total dissolved solids (TDS), electrical conductivity, hardness, alkalinity, and the presence of heavy metals. These parameters provide essential information about the level of pollution and the suitability of water for different uses. Elevated BOD and COD values indicate the presence of organic and chemical pollutants, while low DO levels reflect poor water quality and reduced capacity to support aquatic life. Increased TDS, hardness, and conductivity suggest the presence of dissolved salts and minerals, often resulting from industrial discharge and environmental contamination. This review emphasizes the importance of monitoring physico-chemical parameters for assessing river water quality and discusses the role of modern water softening techniques in mitigating water hardness and contamination. The integration of effective treatment methods and strict environmental regulations is essential for maintaining water quality and ensuring sustainable water resource management.

Keywords: Physico-Chemical Parameters, Water Quality Assessment, Water Hardness, Lime–Soda Ash Process, Water Treatment Optimization, Total Dissolved Solids (TDS).

Phytochemicals Constituents Present In Medicinal Plants

Prasnna Kunde[1], Milind Jangam [1], Surbhi R Thakkur*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: Medicinal plants play a vital role in traditional and modern healthcare systems due to their rich reservoir of bioactive phytochemicals. The present study provides a comprehensive analysis of the major phytochemical constituents found in four important medicinal plants: Neem (Azadirachta indica), Tulsi (Ocimum sanctum), Curry leaves (Murraya koenigii), and Aloe vera (Aloe barbadensis Miller). These plants are widely utilized across India and globally for their therapeutic, nutritional, and pharmacological benefits. Neem contains a diverse group of secondary metabolites such as limonoids (azadirachtin, nimbin, nimbidin), tannins, flavonoids, saponins, and quercetin, which contribute to its strong antimicrobial, anti-inflammatory, antioxidant, and insecticidal activities. Tulsi is rich in essential oils (eugenol, methyl eugenol, carvacrol), triterpenoids (ursolic acid), flavonoids, and phenolic compounds, which provide immunomodulatory, adaptogenic, antimicrobial, and anticancer properties. Curry leaves contain numerous bioactive molecules including carbazole alkaloids (mahanimbine, girinimbine), glycosides, terpenoids, phenolic antioxidants, and vitamins, making them potent agents for antidiabetic, hepatoprotective, hypocholesterolemic, and neuroprotective effects. Aloe vera contains a rich matrix of polysaccharides (acemannan), anthraquinones (aloin, emodin), enzymes, amino acids, vitamins, and plant sterols such as β-sitosterol, which exhibit wound-healing, anti-inflammatory, laxative, moisturizing, and antioxidant functions.This study emphasizes the significance of these phytochemicals in traditional medicine and highlights their potential in pharmaceutical applications. The findings underscore the need for further research, standardization, and development of plant-based therapeutic products to enhance global health care using natural, safe, and cost-effective remedies.

Keywords: Medicinal plants, Phytochemicals, Bioactive compounds, Neem, Tulsi, Curry leaves

Comparative and Simultaneous Estimation of Paracetamol and Ibuprofen in Different Marketed Tablet Formulations by UV-Visible Spectrophotometry

Divya Dinesh Shinde [*1], Asst. Prof. Pankaj Gaikwad [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The present research work aims to develop and apply a simple, rapid, precise, and cost-effective UV–Visible spectrophotometric method for the simultaneous estimation of Paracetamol and Ibuprofen in combined tablet formulations. These drugs are commonly co-formulated due to their synergistic analgesic, antipyretic, and anti-inflammatory properties, thereby necessitating accurate and reliable analytical methods for routine quality control. In the present study, five different marketed brands containing Paracetamol and Ibuprofen were selected for comparative analysis. The tablets were accurately weighed, powdered, and an amount equivalent to the labeled claim of Paracetamol was extracted using a suitable solvent system such as methanol or 0.1 N sodium hydroxide. The resulting solutions were sonicated to ensure complete extraction of active pharmaceutical ingredients, followed by filtration to remove insoluble excipients. Appropriate dilutions were prepared for spectrophotometric analysis. Standard stock solutions of both drugs were prepared, and their absorption maxima (λmax) were determined by scanning in the wavelength range of 200–400 nm. Paracetamol exhibited maximum absorbance at 243 nm, while Ibuprofen showed λmax at 221 nm. Quantitative analysis of the sample solutions was carried out by measuring absorbance at the selected wavelengths and applying the simultaneous equation method based on Beer–Lambert's law. The developed method was successfully employed for the estimation of both drugs in all selected brands, and the results were compared with the labeled claims to assess content uniformity and formulation quality. The method demonstrated good accuracy, precision, and reproducibility, indicating its suitability for routine pharmaceutical analysis. Thus, the proposed UV spectrophotometric method provides an efficient and reliable approach for the simultaneous estimation of Paracetamol and Ibuprofen in combined dosage forms and can be effectively utilized in quality control laboratories.

Keywords: UV–Visible Spectrophotometry, Simultaneous Estimation, Paracetamol, Ibuprofen, Combined Tablet Formulation, Pharmaceutical Analysis, Beer–Lambert's Law, Absorption Maxima (λmax), Quantitative Analysis, Method Development, Quality Control, Calibration Curve, Analytical Method Validation, Drug Content Uniformity

Assessment of Irrigation Water Quality: A Case Study on Groundwater Resources

Sakshi S. Kamble [*1], Dr. Namita More[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Groundwater is one of the most important sources of irrigation in agricultural regions, particularly in developing countries such as India, where dependence on monsoon rainfall is high and surface water resources are often insufficient. However, the quality of groundwater plays a critical role in determining its suitability for irrigation and its long-term impact on soil health and crop productivity. This study presents an assessment of irrigation water quality with a focus on groundwater resources, using a case study approach from semi-arid regions such as Maharashtra.Assessment of irrigation water quality is a critical component in sustainable agricultural management, particularly in regions dependent on groundwater resources. This case study evaluates the physicochemical characteristics of groundwater used for irrigation and examines its suitability for crop production. Key parameters such as pH, electrical conductivity (EC), total dissolved solids (TDS), sodium adsorption ratio (SAR), residual sodium carbonate (RSC), and concentrations of major ions (calcium, magnesium, sodium, chloride, and bicarbonate) were analyzed. The results indicate spatial variability in water quality, influenced by geological formations, agricultural practices, and anthropogenic activities. While some samples fall within permissible limits for irrigation, others show elevated salinity and sodicity hazards, posing risks to soil structure, permeability, and crop yield. The classification of water based on standard indices suggests that prolonged use of marginal-quality groundwater may lead to soil degradation and reduced agricultural productivity. The study highlights the need for regular monitoring and adoption of appropriate management strategies, such as blending of water sources, soil amendments, and selection of salt-tolerant crops. Overall, the findings emphasize the importance of integrated water resource management to ensure long-term agricultural sustainability and environmental protection.

Keywords: Groundwater Quality, Irrigation Water Assessment, Salinity Hazard, Sodium Adsorption Ratio (SAR), Residual Sodium Carbonate (RSC), Electrical Conductivity (EC).

Comparative Analysis of Pigment Yellow 17: Performance and End-Use Applications in Coatings and Inks

Rupesh Ravindra Dhanvi. [*1], Asst. Prof. Mehreen Dawre [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Pigment Yellow 17 (PY17), a widely used azo pigment, has gained significant industrial importance due to its bright hue, cost-effectiveness, and versatile performance in coating and ink formulations. This review presents a comparative analysis of the physicochemical properties, dispersion behavior, stability, and performance characteristics of PY17 in paints and liquid inks. Key parameters such as color strength, opacity, lightfastness, thermal stability, and resistance to chemicals are critically evaluated in relation to different formulation systems. The study highlights how the performance of PY17 varies between coating applications and ink systems due to differences in binders, solvents, and processing conditions. In paints, PY17 demonstrates good opacity and compatibility with various resin systems, making it suitable for decorative and industrial coatings. In contrast, its application in liquid inks emphasizes properties such as dispersibility, viscosity control, and printability. The influence of particle size distribution and surface treatment on pigment performance is also discussed, along with challenges related to environmental stability and regulatory considerations associated with azo pigments. Furthermore, the review explores recent advancements in pigment modification and sustainable alternatives aimed at improving performance and reducing environmental impact. Overall, this comparative analysis provides valuable insights into the functional role of PY17 across different application domains and supports the optimization of formulations for enhanced efficiency and durability in coatings and ink technologies.

Keywords: Pigment Yellow 17 (PY17), Azo pigments, Coatings, Paint formulations, Liquid inks, Opacity, Lightfastness, Industrial applications.

THE ADSORPTION RATE OF ACETIC ACID ON CHARCOAL

Amira Ahmed Karjikar [*1] Ankita Mhaske[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management Mangaon - Raigad, 402-104.*

Abstract: This research study focuses on the preparation of activated carbon from orange peel waste and its use for the removal of acetic acid from water. Orange peels are an easily available agricultural waste and can be converted into a useful adsorbent material. In this study, orange peels were washed, dried, carbonized, and chemically activated to produce activated carbon with good porosity and surface area. Batch adsorption experiments were carried out to study the effect of different concentrations of acetic acid on the adsorption rate and efficiency. The results showed that adsorption increased with increasing concentration at the initial stage due to higher driving force, but decreased at higher concentrations because of saturation of active sites on the adsorbent surface. The study also indicates that adsorption occurs due to physical and chemical interactions between acetic acid molecules and functional groups present on activated carbon. Overall, the prepared activated carbon showed good adsorption capacity and can be used as a low-cost and eco-friendly material for wastewater treatment.This research highlights the importance of converting agricultural waste into useful products and supports sustainable and green chemistry approaches.

Keywords: Activated Carbon, Orange Peel, Adsorption, Acetic Acid, Biomass, Wastewater Treatment, Green Chemistry

Comparative Review of Microwave-Assisted and Conventional Green Synthetic Strategies for Aspirin

Adnan Mubin Bandarkar [*1], Asst. Prof. Vishakha Pawar[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: This review presents a comparative evaluation of conventional thermal and microwave-assisted approaches for the green synthesis of aspirin (acetylsalicylic acid), a widely used non-steroidal anti-inflammatory drug with significant analgesic, antipyretic, anti-inflammatory, and cardioprotective properties. The synthesis of aspirin via acetylation of salicylic acid using acetic anhydride is a well-established esterification reaction, whose efficiency is largely governed by reaction conditions and heating techniques. The review critically examines literature reports on conventional heating methods, which typically employ water bath systems and are associated with longer reaction times, higher energy consumption, and the possibility of incomplete conversion or side product formation. In contrast, microwave-assisted synthesis is discussed as an advanced technique that utilizes dielectric heating to achieve rapid and uniform energy transfer, resulting in enhanced reaction rates and improved efficiency. Comparative analyses reported in the literature are evaluated based on key parameters such as reaction time, percentage yield, product purity, and energy efficiency. Microwave-assisted methods consistently demonstrate reduced reaction times, higher yields, and improved purity relative to conventional approaches. Characterization techniques including melting point analysis, thin layer chromatography (TLC), and infrared (IR) spectroscopy are reviewed to confirm product formation and assess purity. Furthermore, the review highlights the advantages of microwave-assisted synthesis in the context of green chemistry, emphasizing reduced energy consumption and lower environmental impact. Overall, microwave-assisted methods are identified as a more efficient and sustainable alternative for aspirin synthesis.

Keywords: Aspirin, Microwave-Assisted Method, Conventional Heating Method, Green Chemistry, Reaction Kinetics, Pharmaceutical Synthesis.

Impact of Climate Change on Tropospheric Organic Chemical Reactions: A Systematic Review of Emerging Trends

Aditya Khanna*[1], Sayali Kamble[1]

[1]*Department of Chemistry, Satish Pradhan Dnyanasadhana College, Thane*

Abstract: The rapid escalation of global temperatures and shifting humidity patterns significantly alter the fundamental kinetics and pathways of chemical reactions within the Earth's atmosphere. This review examines the emerging trends in tropospheric chemistry as influenced by climate change, with a specific focus on the transformation of Volatile Organic Compounds (VOCs). Through a systematic analysis of recent literature (2020–2026), this study evaluates how thermal energy increases accelerate oxidation rates and modify the lifecycle of biogenic and anthropogenic organic emissions. Key findings highlight the critical shifts in Secondary Organic Aerosol (SOA) formation, where temperature-induced changes in gas-particle partitioning affect air quality and radiative forcing. Furthermore, the paper discusses the feedback loops between rising methane concentrations and the availability of hydroxyl radicals (OH), which serve as the primary atmospheric "detergent." By synthesizing data on photochemical reaction rates and ozone cycle disruptions, this research identifies significant gaps in current climate-chemical models. This review aligns with the conference theme "Innovation Beyond Boundaries" by bridging environmental science with advanced organic reaction mechanisms, providing a roadmap for future interdisciplinary atmospheric research. These insights are vital for developing robust mitigation strategies to address the complex chemical consequences of a warming planet.

Keywords: Climate Change, Atmospheric Chemistry, Organic Oxidation, VOCs, Secondary Organic Aerosols, Reaction Kinetics.

Formulation and evolution of herbal soap by using plant extract

Sanskruti mohite [*1], Shubham Yerunkar [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Herbal soap is a natural skincare product prepared by using extracts obtained from medicinal plants. In recent years, people have become more aware about the harmful effects of chemical-based cosmetics and therefore the demand for herbal products has increased rapidly. Herbal soaps contain natural ingredients which are beneficial for the skin and help in maintaining skin health. In the present study, herbal soap was formulated by using plant materials such as neem, tulsi, aloe vera, and turmeric, which are widely known for their medicinal and antimicrobial properties. These plants contain various phytochemicals such as flavonoids, tannins, phenols, and alkaloids that help in protecting the skin from microbial infections and skin disorders. The preparation of herbal soap involves extraction of plant materials and mixing them with a suitable soap base followed by molding and cooling. The prepared soap was further evaluated for its physical and chemical properties including color, fragrance, pH value, foam stability, and texture. The study also focuses on the advantages of herbal soap such as its eco-friendly nature, skin compatibility, and absence of harmful synthetic chemicals. The results showed that herbal soap prepared from plant extracts provides good cleansing action and helps in nourishing and protecting the skin. Therefore, herbal soap can be considered as a safe and effective alternative to commercial chemical soaps and has great importance in the field of herbal cosmetics and natural healthcare products.

Keywords: Herbal Soap, Medicinal Plants, Plant Extracts, Neem, Tulsi, Aloe Vera, Natural Cosmetics, Herbal Formulation.

To Study on Sugar Content Present in Sugar-Free Fruit Juices Using Volumetric and Instrumental Methods

Ayesha Mehboob Pardeshi*[1], Asst. Prof. Shubham Yerunkar[1]
[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: Sugar-free fruit juices are widely consumed as healthier alternatives to conventional beverages due to increasing awareness of the harmful effects of excessive sugar intake. However, the term "sugar-free" does not necessarily indicate the complete absence of sugars, as naturally occurring sugars may still be present in fruit-based products. The present study aims to determine and evaluate the sugar content present in commercially available sugar-free fruit juices using a combination of classical volumetric and instrumental analytical techniques. Fehling's titration

method based on the Lane–Eynon principle was employed for the estimation of reducing sugars, while UV–Visible spectrophotometry was used for quantitative analysis through colorimetric methods. In addition, physicochemical parameters such as viscosity and pH were measured using viscometry and pH meter respectively to support analytical findings. The results obtained from different methods were compared to assess their accuracy, precision, and applicability in routine laboratory analysis. The study also examined the relationship between sugar concentration and

physicochemical properties of the beverages. Findings indicate that even sugar-free fruit juices may contain detectable levels of sugars, highlighting the importance of analytical verification of labeling claims. Overall, the study demonstrates that simple and cost-effective laboratory techniques can provide reliable data for sugar analysis and contribute to quality control, consumer awareness, and food safety evaluation.

Keywords: Sugar-Free Fruit Juices, Reducing Sugars, Fehling's Titration, UV-Visible Spectrophotometry, Viscometry, pH Analysis, Food Quality Control

Determination of Iron Content in Different Branded Iron Syrups Using UV-Visible Spectrophotometry

Kunal Anil Jadhav [*1], Tahsin Rawoot [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The present study focuses on the determination of iron content in different branded iron syrups using UV–Visible spectrophotometry. Iron is an essential micronutrient required for vital physiological functions such as oxygen transport, enzyme activity, and hemoglobin synthesis. Iron deficiency remains a major public health concern, particularly among children and pregnant women, thereby necessitating accurate evaluation of iron content in pharmaceutical formulations to ensure efficacy and safety. In this study, various commercially available iron syrup brands were selected for quantitative analysis. The samples were appropriately diluted and treated with suitable reagents to form a colored iron complex, which exhibits maximum absorbance in the visible region. Typically, iron reacts with complexing agents such as thiocyanate or o-phenanthroline to produce a stable-colored complex. The intensity of the color formed is directly proportional to the concentration of iron present in the sample, following Beer–Lambert's law. A series of standard iron solutions were prepared to construct a calibration curve by measuring absorbance at the selected wavelength (λmax). The absorbance of the prepared sample solutions was then recorded using a UV–Visible spectrophotometer, and the iron content in each brand was determined by interpolation from the calibration curve. The results obtained were compared with the labeled claims to evaluate the accuracy, consistency, and quality of the formulations. The method demonstrated good linearity, precision, and reproducibility within the selected concentration range. Any variation observed among different brands highlights the importance of stringent quality control measures in pharmaceutical manufacturing. In conclusion, the proposed UV–Visible spectrophotometric method provides a simple, rapid, and cost-effective approach for the determination of iron content in syrup formulations and can be effectively employed for routine quality control analysis in pharmaceutical laboratories.

Keywords: UV–Visible spectrophotometry, iron determination, iron syrups, pharmaceutical analysis, Beer–Lambert's law, calibration curve, colored complex formation, quantitative analysis, quality control, method validation

GREEN SYNTHESIS OF IRON NANOPARTICLES USING PLANT EXTRACTS

Student[1], Student [1], Dhanashri G. Kamblekar*[1],

[1]Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.

Abstract: Green synthesis of iron nanoparticles (FeNPs) has emerged as an environmentally sustainable and cost-effective alternative to conventional chemical and physical methods. In the present study, iron nanoparticles were synthesized using plant extract as a natural source of reducing and stabilizing agents, eliminating the need for hazardous chemicals and high energy processes. Phytochemicals such as polyphenols, flavonoids, and proteins present in the extract facilitated the reduction of iron ions and simultaneously capped the newly formed nanoparticles, providing enhanced stability. The formation of FeNPs was initially confirmed by visible colour change and further characterized using techniques such as UV-Visible spectroscopy, X-ray diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), and electron microscopy. The synthesized nanoparticles showed nanoscale size, crystalline nature, and the presence of plant-derived functional groups on their surface. Preliminary application evaluation demonstrated promising antibacterial and catalytic properties, highlighting their potential use in wastewater treatment, biomedical fields, and environmental remediation. Overall, this green approach ensures simple, rapid, economical, and eco-friendly synthesis of FeNPs, offering a sustainable platform for future nanotechnology-based applications.

Keywords: Green synthesis; Iron nanoparticles (FeNPs); Plant extract; Phytochemicals; Eco-friendly synthesis; Reduction and capping agents.

Green Synthesis Of Zinc Oxide Nanoparticles Using Bryophyllum Plant

Akash Jadhav[1], Kunal Jadhav[1], Kaustubh P. Risbud*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: Green synthesis of zinc oxide nanoparticles (ZnO NPs) using plant extracts has emerged as an eco-friendly, cost-effective, and non-toxic alternative to conventional chemical and physical synthesis methods. Bryophyllum pinnatum, a widely used medicinal plant rich in bioactive phytochemicals such as flavonoids, phenolics, glycosides, and organic acids, has shown significant potential as a natural reducing and stabilizing agent in nanoparticle formation. This review summarizes the phytochemical basis of Bryophyllum-mediated ZnO nanoparticle synthesis, discupinnatum, Phytochemicals, Biomedical applications in various reported synthesis methods, highlights their physicochemical characteristics, and outlines major biological and environmental applications. In addition, this review identifies current limitations and future research directions to enhance the reproducibility, scalability, and biomedical safety of Bryophyllum-based ZnO nanoparticles.

Keywords*:* Green synthesis, Zinc oxide nanoparticles, Bryophyllum

To prepare Anthracene from 9, 10 -Anthraquinone

Omkar P. Maluskar[1], Atul S. Khaire[1], Surbhi R. Thakur*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: This project focuses on the study of anthracene and its preparation from 9,10-anthraquinone, an important aromatic quinone. Anthraquinone derivatives are widely used in dyes, pigments, pharmaceuticals, and organic synthesis. Converting 9,10-anthraquinone to anthracene involves a general reduction process in which the carbonyl groups are removed, restoring the fully conjugated aromatic system. The project includes a review of the structural features, properties, and applications of anthraquinone and anthracene, along with a theoretical understanding of the transformation between them. Additionally, the report highlights the relevance of eugenol extraction from clove powder as part of related aromatic compound studies. Overall, this work provides conceptual insight into aromatic chemistry, reaction mechanisms, and the significance of polycyclic aromatic hydrocarbons

Keywords: Anthracene, 9,10-Anthraquinone, Reduction, Ethanol, Crystallization

Industrial Process Effluent Treatment And Hazardous Waste Management

Ganesh Malusare [*1], Naziya Jummal [1]

[1.] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad,402-104.*

Abstract: The chemical industry is a major contributor to global economic development, but it also generates significant quantities of process effluent and hazardous waste, which can have harmful effects on the environment and human health if not properly managed. The proper handling of these by-products is therefore crucial in minimizing pollution, ensuring regulatory compliance, and promoting sustainable practices. This project focuses on the development and implementation of an integrated waste management system specifically tailored to the needs of the chemical industry. The primary objective of this project is to create an efficient, cost-effective, and environmentally sound approach to managing industrial process effluent and hazardous waste within chemical manufacturing plants. The project aims to address the key challenges faced by the industry in treating and disposing of waste, while adhering to stringent environmental regulations and improving operational sustainability.

Keywords: Safe Disposal and Recycling, Hazardous Waste Minimization, Effluent Treatment Technologies, AOPs.

The Green Synthesis of heterocyclic compound of Pyridine

Vansh P. Gosavi[*1], Asst. Prof. Tahsin Rawoot [1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: Green synthesis has emerged as a sustainable approach in organic chemistry, focusing on minimizing environmental impact while enhancing efficiency. Pyridine, a vital heterocyclic compound, plays a significant role in pharmaceuticals, agrochemicals, and material science. Conventional methods for pyridine synthesis often involve toxic reagents, harsh conditions, and low atom economy. In contrast, green synthesis strategies utilize eco-friendly solvents, renewable feedstocks, and energy-efficient techniques such as microwave irradiation, ultrasound, and catalytic processes. Recent advancements include the use of biocatalysts, ionic liquids, and metal-free catalysts, which reduce hazardous waste and improve selectivity and yield. Multicomponent reactions (MCRs) have also gained attention for their ability to construct pyridine derivatives in a single step with high efficiency. Additionally, solvent-free conditions and water-based reactions further support sustainability goals. These approaches align with the principles of green chemistry by reducing toxicity, waste generation, and energy consumption. Overall, green synthesis of pyridine derivatives offers a promising pathway toward environmentally benign and economically viable chemical production, contributing to the development of safer industrial processes and innovative applications.

Keywords: Green synthesis, Pyridine, Heterocyclic compounds, Sustainable chemistry, Multicomponent reactions, Eco-friendly catalysts.

Green Synthesis and Characterization of ZnO Nanoparticles Using Azadirachta indica Leaf Extract: A Comprehensive Review

Siddhesh R. Disale[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: The growing demand for environmentally sustainable nanomaterials has accelerated the development of green synthesis approaches for metal oxide nanoparticles. This review focuses on the biosynthesis and characterization of zinc oxide (ZnO) nanoparticles using aqueous leaf extract of *Azadirachta indica* (Neem). Neem leaves are rich in bioactive phytochemicals such as flavonoids, alkaloids, terpenoids, and phenolic compounds, which function as natural reducing, stabilizing, and capping agents during nanoparticle formation. Compared to conventional chemical and physical methods, this green synthesis approach offers advantages including cost-effectiveness, simplicity, and the avoidance of toxic reagents. The review critically examines key factors influencing nanoparticle synthesis, such as pH, temperature, reaction time, and extract concentration, which play a significant role in determining particle size, morphology, and yield. Various characterization techniques reported in the literature are discussed, including UV–Visible spectroscopy for optical properties, X-ray diffraction (XRD) for crystalline structure, Fourier transform infrared spectroscopy (FTIR) for functional group analysis, and scanning and transmission electron microscopy (SEM and TEM) for morphological evaluation. Furthermore, neem-mediated ZnO nanoparticles demonstrate significant potential in diverse biological and industrial applications, including antimicrobial activity, antioxidant properties, and catalytic performance. Overall, this review highlights the effectiveness of plant-mediated synthesis as a sustainable alternative and underscores its importance in advancing green nanotechnology.

Keywords: Bryophyllum pinnatum, Bioactive compounds, Phytochemical analysis, Qualitative & quantitative analysis, UV-Visible spectroscopy, Medicinal plants.

Evaluation and Method Validation of Voriconazole using UV Visible and FTIR Spectrophotometry

Sanika M. Ubhare [*1], Pankaj S. Gaikwad [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Voriconazole, a broad-spectrum triazole antifungal agent widely used in the treatment of invasive fungal infections, requires precise and reliable analytical methods for its quantitative estimation in pharmaceutical formulations. The present study focuses on the development and validation of simple, rapid, and cost-effective spectrophotometric methods using UV-Visible and Fourier Transform Infrared (FTIR) techniques for the analysis of Voriconazole. In the UV-Visible spectrophotometric method, Voriconazole exhibited maximum absorbance (λmax) at an appropriate wavelength in a suitable solvent system, obeying Beer-Lambert's law over a specific concentration range. Key validation parameters such as linearity, accuracy, precision, limit of detection (LOD), and limit of quantification (LOQ) were evaluated in accordance with International Council for Harmonisation (ICH) guidelines. The method demonstrated excellent linearity with high correlation coefficients, along with satisfactory recovery values, indicating accuracy and reproducibility. FTIR spectrophotometric analysis was employed to confirm the identity and structural integrity of Voriconazole by identifying characteristic functional group peaks. The method also supported qualitative analysis and ensured the absence of significant interference from excipients in pharmaceutical formulations. Both methods were found to be robust, reliable, and suitable for routine quality control analysis. The combined use of UV-Visible and FTIR spectrophotometry provides a comprehensive approach for both quantitative and qualitative evaluation of Voriconazole, offering a valuable alternative to more complex and expensive analytical techniques. In conclusion, the validated methods can be effectively applied in pharmaceutical industries and research laboratories for the routine analysis and quality assurance of Voriconazole formulations.

Keywords: Voriconazole, UV-Visible Spectrophotometry, FTIR, Method Validation, ICH Guidelines, Antifungal Agents

To study the synthesis of Azo Derivatives of some primary amines & Phenols

Umesh M. Jumare [*1], Ankita mhaske[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Azo derivatives are an important class of organic compounds characterized by the presence of the azo group (–N=N–), which links two aromatic systems. These compounds are widely used as dyes, pigments, indicators, and in various industrial and pharmaceutical applications. The present study focuses on the synthesis of azo derivatives from primary aromatic amines and phenols through diazotization and coupling reactions. In the first step, primary aromatic amines are treated with nitrous acid at low temperatures (0–5°C) to form stable diazonium salts. These intermediates are highly reactive and play a crucial role in azo compound formation. In the subsequent step, the diazonium salts undergo electrophilic substitution reactions with activated aromatic compounds such as phenols or aromatic amines, leading to the formation of brightly colored azo derivatives. The reaction conditions, including pH, temperature, and concentration, significantly influence the yield and stability of the final products. Phenols typically react in alkaline medium, whereas aromatic amines couple effectively in mildly acidic conditions. The synthesized azo compounds are analyzed based on their color, solubility, and chemical properties, confirming successful formation. This study highlights the importance of controlled experimental conditions and demonstrates the versatility of azo coupling reactions in organic synthesis. The findings contribute to a better understanding of azo chemistry and its practical applications in dye manufacturing and related field

Keywords: Azo derivatives, Diazotization, Azo coupling, Primary aromatic amines, Phenols, Diazonium salts, Electrophilic substitution, Organic synthesis, Azo dyes, Reaction conditions

Synthesis and Characterization of Novel Phthalimide Derivative a with Antibacterial Activity

Saurabh Palkar*[1], Asst. Prof. Shubham Yerunkar[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: Phthalimide derivatives have gained considerable attention due to their diverse biological activities, particularly in medicinal chemistry. In the present study, a series of novel phthalimide-based compounds were successfully synthesized using condensation and substitution reactions, with the objective of enhancing their antibacterial efficacy. The synthesized compounds were structurally characterized and confirmed through various spectroscopic techniques, including Fourier Transform Infrared Spectroscopy (FT-IR), Proton Nuclear Magnetic Resonance (^{1}H NMR), Carbon-13 Nuclear Magnetic Resonance (^{13}C NMR), and mass spectrometry. Additionally, elemental analysis was performed to validate their molecular composition and purity. The antibacterial potential of the synthesized derivatives was evaluated against both Gram-positive bacteria, such as Staphylococcus aureus, and Gram-negative bacteria, including Escherichia coli, using the agar well diffusion method. The results indicated that several compounds exhibited moderate to strong antibacterial activity, demonstrating their effectiveness against the tested microbial strains. It was observed that the nature and position of substituents on the phthalimide core significantly influenced the biological activity of the compounds. Overall, the findings of this study highlight the importance of structural modification in enhancing antibacterial properties and suggest that phthalimide derivatives could serve as promising scaffolds for the development of new antibacterial agents. Further studies are recommended to explore their mechanism of action and potential therapeutic applications.

Keywords: Phthalimide derivatives, Antibacterial activity, Gram-positive bacteria, Gram-negative bacteria, Spectroscopic characterization.

Green Synthesis of Copper Oxide Nano Particles Using Plant Extract & Its Characterization

Sagar Sreenivas[1], Ritu R Warekar [1], Dhanashri G. Kamblekar*[1],

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract:

Green synthesis of metal oxide nanoparticles has emerged as an eco-friendly and sustainable alternative to conventional physical and chemical methods. In this study, copper oxide nanoparticles (CuO NPs) were synthesized using plant extract as a natural reducing and stabilizing agent. The phytochemicals present in the plant extract, such as phenolics, flavonoids, and alkaloids, play a crucial role in the reduction of copper ions and the formation of stable CuO nanoparticles without the use of toxic chemicals. The synthesized CuO nanoparticles were characterized using techniques such as UV–Visible spectroscopy, X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), and transmission electron microscopy (TEM) to confirm their structural, morphological, and functional properties. The results indicated the formation of crystalline CuO nanoparticles with nanoscale dimensions and relatively uniform morphology. Furthermore, the green-synthesized CuO nanoparticles demonstrated significant antibacterial and antioxidant activities, highlighting their potential applications in biomedical, environmental, and catalytic fields. This study confirms that plant-mediated synthesis is a simple, cost-effective, and environmentally benign approach for producing copper oxide nanoparticles with promising functional properties.

Keywords: Green Synthesis, Copper oxide nanoparticles, Plant extract, Characterization, Antibacterial activity.

Green synthesis of ZnO nanoparticles using orange fruit peel extract for antibacterial activities.

Tejal N. Navshe [*1], Shubham Yerunkar [1]

[1]*D.G. Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: This research presents an eco-friendly biotechnological approach for synthesizing Zinc Oxide (ZnO) nanoparticles using orange peel extract (Citrus sinensis) as a natural reducing and stabilizing agent. Traditional synthesis methods often require toxic reagents and high energy; however, this study utilizes agricultural waste rich in polyphenols, flavonoids, and ascorbic acid to facilitate a sustainable "Green Chemistry" alternative.The experimental process involves reacting a zinc nitrate precursor with the aqueous extract under thermal stirring. Phytochemical functional groups reduce Zn^{2+} ions into intermediates, which are converted into stable ZnO nanoparticles through calcination (400°C–600°C), resulting in a pure hexagonal wurtzite structure.A primary focus is characterization via UV-Visible Spectroscopy. Successful synthesis is confirmed by a sharp Surface Plasmon Resonance (SPR) peak between 360 nm and 380 nm. This blue-shifted absorption indicates significant quantum confinement effects. Using the Tauc relation, the optical band gap was determined to be approximately 3.3 eV, confirming the high purity and semiconducting nature of the biogenic nanoparticles.Functional testing revealed exceptional antibacterial efficacy against S. aureus and E. coli. The mechanism involves the generation of Reactive Oxygen Species (ROS), which induce oxidative stress and physically disrupt bacterial cell membranes. This study confirms that orange peel-mediated synthesis is a cost-effective, non-toxic, and scalable route for producing high-quality ZnO nanoparticles. These findings suggest strong potential for applications in biomedical engineering, wastewater remediation, and antimicrobial coatings, offering a superior alternative to conventional synthetic methodologies.

Keywords: Green Synthesis, ZnO Nanoparticles, Citrus sinensis, Orange, Peel Extract, UV-Vis Spectroscopy,Surface Plasmon, Resonance (SPR), Optical Band Gap, Antibacterial Activity, Green Chemistry, Agricultural Waste.

Psidium Guajava leaf extract mediated Green Synthesis of ZnO nanoparticles and its potential applications in Photocatalysis

Shivam V. Sutar [1], Yash D. Surve [1], Amol K. Nikam*[1], Dhanashri G. Kamblekar*[1],

[1] Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.

Abstract: The increasing discharge of toxic organic pollutants, particularly synthetic dyes from textile and related industries, poses a serious threat to water quality and environmental sustainability. Conventional treatment methods are often ineffective, costly, and generate secondary pollution. In this context, photocatalysis has emerged as a promising and eco-friendly approach for the degradation of hazardous contaminants. Zinc oxide (ZnO) nanoparticles are widely used as semiconductor photocatalysts due to their high photosensitivity, chemical stability, and strong oxidizing ability. Recently, green synthesis methods employing plant extracts have gained significant attention as sustainable alternatives to conventional chemical routes. *Psidium guajava* (guava) leaf extract is rich in phytochemicals such as flavonoids, tannins, and phenolic compounds, which act as natural reducing and stabilizing agents in nanoparticle synthesis. In this study, ZnO nanoparticles were synthesized using *Psidium guajava* leaf extract via a simple, cost-effective, and environmentally benign method. The synthesized nanoparticles exhibited enhanced photocatalytic activity in the degradation of toxic dyes under light irradiation. This approach highlights the potential of plant-mediated ZnO nanoparticles as efficient and sustainable materials for wastewater treatment applications.

Keywords: *Psidium guajava*, Green Synthesis, Zinc Oxide (ZnO) NPs, Photocatalysis, Dye Degradation, Plant Extract, Wastewater Treatment.

Magnetic Stirrer-Assisted Synthesis, Characterization, and Classification of Schiff Base Ligands: A Comprehensive Review

Piyush P. Dhumal[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Schiff bases represent a significant class of organic compounds characterized by the presence of an azomethine (–C=N–) functional group, with wide-ranging applications in medicinal chemistry, coordination chemistry, and materials science. This review provides a comprehensive overview of the synthesis, characterization, and classification of Schiff base ligands, with particular emphasis on the magnetic stirrer-assisted method. The use of magnetic stirring offers a simple and efficient approach, ensuring homogeneous mixing of reactants, enhanced reaction kinetics, reduced reaction time, and improved product yields compared to conventional synthetic techniques. The review discusses various synthetic strategies employing magnetic stirring, followed by purification methods and detailed characterization using standard analytical techniques such as melting point analysis, UV–Visible spectroscopy, and Fourier Transform Infrared (FTIR) spectroscopy. The formation of Schiff bases is primarily confirmed by the characteristic azomethine (–C=N–) stretching vibration, while advanced techniques such as Nuclear Magnetic Resonance (NMR) spectroscopy are highlighted for structural elucidation where applicable. Furthermore, the classification of Schiff bases is systematically presented based on structural diversity, nature of substituents, and functional group variations. The influence of electron-donating and electron-withdrawing substituents on the physicochemical properties and stability of the compounds is also critically analyzed. Overall, this review underscores the effectiveness, simplicity, and reliability of the magnetic stirrer method as a practical approach for the synthesis of high-purity Schiff base ligands with good yields, and highlights its relevance in modern synthetic and applied chemistry.

Keywords: Schiff base, Azomethine group, Magnetic stirrer method, Organic synthesis, Functional group analysis, Classification of compounds.

Integrated Potentiometric and Spectroscopic Investigation of Copper (II) Complexes with Drug-Derived O, N, S Donor Ligands: Stability, Structural Elucidation and Biological Implications

A.S. Jagtap[1], S.V. Thakur[2]

Department of Chemistry, Shri Siddheshwar Mahavidyalaya Majalgaon, Maharashtra. India[1]

Department of Chemistry, Milliya Arts, Science and Management Science College, Beed, Maharashtra, India[2]

akshayjagtap47@gmail.com

Abstract: The development of transition metal complexes derived from biologically active ligands has emerged as a promising strategy in modern medicinal and coordination chemistry. In the present study, copper(II) complexes of drug-derived O,N,S donor ligands were synthesized and systematically characterized using potentiometric and spectroscopic techniques. The selected ligands were chosen based on their pharmaceutical relevance and strong chelating ability toward transition metal ions. Potentiometric titrations were performed using the Irving–Rossotti method under controlled ionic strength conditions to evaluate proton–ligand and metal–ligand stability constants. The formation equilibria of the complexes were analyzed, and the calculated stability constants (log β values) indicated strong coordination between copper(II) ions and the ligands, suggesting the formation of highly stable complexes. Spectroscopic characterization using UV–Visible and FTIR techniques confirmed the coordination behavior and identified the probable binding sites involving oxygen, nitrogen, and sulfur donor atoms. The spectral data supported the formation of octahedral or distorted octahedral geometries depending on ligand structure and coordination mode. Furthermore, the biological implications of the synthesized complexes were evaluated based on their enhanced stability and potential antimicrobial activity. Chelation was found to increase lipophilicity, facilitating better interaction with biological targets. The study emphasizes the importance of metal–ligand interactions in drug design and provides valuable insights into structure–activity relationships. Overall, this work contributes to the advancement of bioinorganic chemistry and highlights the potential of metal-based complexes as therapeutic agents.

Keywords: Copper(II) complexes, Potentiometric analysis, Irving–Rossotti method, Stability constants, Spectroscopic characterization, Bioinorganic chemistry, Drug-derived ligands, Antimicrobial activity

Green Synthesis of Silver Nanoparticles Using *Ocimum sanctum* (Tulsi) Leaf Extract and Their Antimicrobial Activity: A Comprehensive Review

Gaurav A. Divkar[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Green synthesis of silver nanoparticles (AgNPs) has emerged as an eco-friendly, cost-effective, and sustainable alternative to conventional chemical and physical methods that often involve toxic reagents and high energy input. This review highlights the plant-mediated synthesis of AgNPs using leaf extract of *Ocimum sanctum* (Tulsi) and critically examines their antimicrobial potential. Phytoconstituents such as flavonoids, phenolics, and terpenoids present in *Ocimum sanctum* play a dual role as reducing and stabilizing agents, facilitating the efficient conversion of silver ions into stable nanoparticles. The review discusses the underlying mechanisms of nanoparticle formation, with initial confirmation typically indicated by a characteristic color change due to surface plasmon resonance, followed by spectroscopic validation using UV–Visible analysis. Emphasis is placed on the physicochemical properties of the biosynthesized nanoparticles, including size, morphology, and surface characteristics, which significantly influence their biological activity. Furthermore, the antimicrobial efficacy of *Ocimum sanctum*-derived AgNPs is comprehensively analyzed against a range of pathogenic microorganisms. The mechanism of antimicrobial action is attributed to multiple factors, including disruption of microbial cell membranes, generation of reactive oxygen species, and interference with intracellular processes. Overall, this review underscores the effectiveness of *Ocimum sanctum*-mediated green synthesis as a simple, rapid, and environmentally benign approach for producing bioactive silver nanoparticles. The findings highlight their promising applications in antimicrobial therapy, wound healing, drug delivery, and other biomedical fields, reinforcing the growing importance of green nanotechnology in combating microbial resistance and ensuring environmental safety.

Keywords: Green synthesis, Silver nanoparticles (AgNPs), *Ocimum sanctum* (Tulsi), Antimicrobial activity, Plant-mediated synthesis, Phytochemicals, Eco-friendly synthesis.

To prepare 1,2,4-triacetoxybenzene from p-benzoquinone

Roshan.R.Shirke[1], Darshan.K.Sakpal[2], Dhanashri. G. Kambalekar*[3]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: This project focuses on the study of 1,2,4-triacetoxybenzene and its preparation from p-benzoquinone, an important aromatic quinone. The abstract of the reaction of p-benzoquinone to 1,2,4-triacetoxybenzene (Thiele-Winter reaction) is that p-benzoquinone reacts with acetic acid (or acetic anhydride) in the presence of an acid catalyst (like sulphuric acid) to produce 1,2,4-triacetoxybenzene with high yield. p-benzoquinone derivatives are widely used in Drug Intermediate, Precursor to 1,2,4-trihydroxybenzene,Pharmaceutical Synthesis, Cosmetics & General Organic Synthesis. This reaction converts the quinone to an aromatic triacetoxy compound and has been used for various quinones,

Keywords: Thiele-Winter acetoxylation, Thiele acetylation,p-benzoquinone, Acetic anhydride, Sulphuric acid

Synthesis of Green Copper Nanoparticles Using Medicinal Plant curry leaves Extract and Its characterization by Sem TEM and FTIR and it's application as catalyst

Pranita More[*1] , Asst. Prof. Naziya Jummal [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Green synthesis of Nanotechnology has emerged as a rapidly advancing field with wide-ranging applications in science and technology. Among various nanomaterials, metal nanoparticles have gained considerable importance due to their unique physical, chemical, and catalytic properties. Copper nanoparticles (CuNPs), in particular, are widely studied because of their excellent catalytic activity, electrical conductivity, antimicrobial properties, and cost-effectiveness compared to noble metals such as gold and silver. However, conventional methods of synthesizing copper nanoparticles involve toxic chemicals, high energy consumption, and complex procedures, which can pose environmental and health hazards. To address these challenges, green synthesis using plant extracts has been developed as a sustainable and eco-friendly alternative. In the present study, copper nanoparticles were synthesized using Murraya koenigii (curry leaves) extract as a natural reducing and stabilizing agent. The phytochemicals present in curry leaves, including flavonoids, phenolic compounds, alkaloids, and terpenoids, play a significant role in the reduction of copper ions (Cu^{2+}) into copper nanoparticles (Cu^{0}) and in stabilizing them by preventing aggregation. The synthesis process was simple and cost-effective, and the formation of CuNPs was confirmed by a visible color change from blue to dark brown due to surface plasmon resonance. The synthesized nanoparticles were characterized using advanced analytical techniques such as Scanning Electron Microscopy (SEM), Transmission Electron Microscopy (TEM), and Fourier Transform Infrared Spectroscopy (FTIR). SEM analysis provided information about the surface morphology of the nanoparticles, revealing mostly spherical or irregular shapes. TEM analysis offered detailed insights into particle size and distribution, confirming that the nanoparticles were within the nanoscale range, typically between 10–50 nm. FTIR analysis confirmed the presence of various functional groups such as hydroxyl, carbonyl, and amine groups, indicating the involvement of plant biomolecules in the reduction and stabilization of nanoparticles. Furthermore, the catalytic activity of the synthesized copper nanoparticles was evaluated using the reduction of 4-nitrophenol to 4-aminophenol in the presence of sodium borohydride ($NaBH_4$). The CuNPs exhibited excellent catalytic efficiency, significantly enhancing the rate of the reaction due to their high surface area and availability of active sites. This demonstrates their potential application in environmental remediation, particularly in the removal of toxic pollutants from wastewater. In conclusion, the present study demonstrates that green synthesis of copper nanoparticles using curry leaves extract is an effective, economical, and environmentally friendly approach. The synthesized CuNPs exhibit desirable structural properties and significant catalytic activity, highlighting their potential for applications in catalysis, environmental protection, and sustainable nanotechnology.

Keywords: Green synthesis, Copper nanoparticles (CuNPs), Murraya koenigii, Curry leaves extract, SEM, TEM, FTIR, Catalytic activity, 4-nitrophenol reduction, Eco-friendly nanotechnology

Synthesis and Characterization of Binol from β-Napthol

Sakshi Shinde [1], Siddhi Surve [1], Dhanshree G. Kamblekar*[1],

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: An efficient resolution method for racemic BINOL and 4,4′-dibromo-spirobiindane-7,7′-diol has been developed using (−)-methyl chloroformate as a resolving agent in the presence of tetrabutylammonium bromide under aqueous NaOH/$CHCl_3$ biphasic conditions. The resulting protected intermediates were subsequently deprotected using an aqueous KOH/ethanol system to afford optically enriched diols. Furthermore, a new class of aza-crown ether-functionalized BINOL-based chiral catalysts was designed and synthesized, and their catalytic performance was evaluated in asymmetric Michael addition reactions of alkylboronic acids to α,β-unsaturated ketones. The modified catalysts exhibited significantly enhanced enantioselectivity compared to conventional BINOL catalysts, highlighting the beneficial effect of aza-crown ether incorporation in improving catalytic efficiency and stereocontrol.

Keywords: Keywords: BINOL, β-naphthol, asymmetric synthesis, organocatalyst, chiral ligand, enantioselectivity, green chemistry

Estimation of Acidity of Water Sample By Titrimetric Method

Shifa S. Wasta [*1], Dr. Namita More [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Water is an essential natural resource that is vital for the survival of all living organisms and plays a significant role in maintaining environmental balance and public health. The quality of water is determined by various physical, chemical, and biological parameters, among which acidity is an important chemical characteristic. Acidity indicates the presence of acidic substances in water and helps in assessing its suitability for domestic, industrial, and environmental uses. The present study focuses on the estimation of acidity of a water sample by the titrimetric method. Acidity in water is primarily caused by dissolved carbon dioxide, mineral acids, organic acids, and acidic salts. These may originate from natural sources such as decomposition of organic matter and atmospheric absorption of carbon dioxide, as well as from human activities including industrial effluents, mining operations, and acid rain. Excessive acidity in water can lead to corrosion of pipelines, leaching of toxic metals like lead and copper, unpleasant taste, and harmful effects on aquatic life and ecosystems. The study employs the titrimetric method, which is based on the principle of acid–base neutralization. In this method, a known volume of water sample is titrated against a standard sodium hydroxide solution using suitable indicators such as phenolphthalein or methyl orange. The endpoint of the reaction is indicated by a distinct color change, signifying complete neutralization of acidic components. The volume of alkali consumed is used to calculate the acidity, which is expressed in terms of mg/L as $CaCO_3$. This method is simple, accurate, and cost-effective, making it suitable for routine laboratory analysis. The results obtained from this study help in evaluating water quality, ensuring its safety for various uses, and highlighting the importance of regular monitoring and effective water management practices.

Keywords: Titrimetric Analysis, Neutralization Reaction, Indicator-Based Endpoint Detection, Phenolphthalein, Methyl Orange.

THE PLANT MEDIATED SYNTHESIS OF (Cu) NANOPARTICLE USING FRUIT EXTRACT BETA VULGARIS

Manasi Milind Gamare[*1], Asst. Prof. Tahseen Raowoot[1]
[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Green synthesis of metal nanoparticles has gained significant attention due to its eco-friendly, cost-effective, and sustainable approach. In the present study, copper (Cu) nanoparticles were synthesized using fruit extract of Beta vulgaris as a reducing and stabilizing agent. The phytochemicals present in the extract, such as betalains, flavonoids, and phenolic compounds, facilitated the bioreduction of copper ions into Cu nanoparticles. The synthesis was indicated by a visible color change and further confirmed using standard characterization techniques including UV‑Visible spectroscopy, X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). The results revealed that the synthesized nanoparticles were predominantly spherical with nanoscale dimensions and showed good stability. The study demonstrates that Beta vulgaris fruit extract is an efficient biological source for the green synthesis of Cu nanoparticles, which may have potential applications in antimicrobial, catalytic, and biomedical fields.

Keywords: Plant-Mediated synthesis, Beta vulgaris, Copper nanoparticles, Green synthesis, Fruit extract, FTIR, SEM, Antimicrobial activity

Green Synthesis of Copper Nanoparticles Using Neem Leaf Extract and Their Characterization

Paurnima S. Malusare [1], Shubham Yerunkar [*1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: This study focuses on the green synthesis of copper nanoparticles (CuNPs) using neem (Azadirachta indica) leaf extract and their subsequent characterization. With increasing environmental concerns associated with conventional chemical synthesis methods, green synthesis has emerged as an eco-friendly, cost-effective, and sustainable alternative. Neem leaves are known to contain a variety of bioactive compounds such as flavonoids, alkaloids, terpenoids, and phenolic substances, which act as natural reducing and stabilizing agents in nanoparticle synthesis. In this work, fresh neem leaves were collected, washed, and subjected to aqueous extraction. The prepared leaf extract was then added to a copper sulfate solution under controlled conditions. The formation of copper nanoparticles was indicated by a visible color change from blue to dark brown, confirming the reduction of copper ions. The synthesis parameters such as temperature, pH, and concentration were optimized to obtain stable nanoparticles. The synthesized copper nanoparticles were characterized using various analytical techniques. UV–Visible spectroscopy was used to confirm nanoparticle formation by observing the characteristic surface plasmon resonance peak. Fourier Transform Infrared Spectroscopy (FTIR) analysis identified the functional groups responsible for reduction and capping of nanoparticles. The study demonstrates that neem leaf extract is an effective and environmentally benign source for the synthesis of copper nanoparticles. The synthesized nanoparticles showed good stability and potential applicability in areas such as antimicrobial activity, catalysis, and environmental remediation. Overall, this method provides a simple, rapid, and green approach for nanoparticle synthesis, reducing the use of hazardous chemicals and promoting sustainable nanotechnology.

Keywords: Green synthesis, Copper nanoparticles, Neem leaf extract, Azadirachta indica, UV–Visible spectroscopy, Nanotechnology, Eco-friendly synthesis, Antimicrobial activity.

Phytochemical Extraction and Analysis of Flower Essential Oil

Rohit Anil Salunke [*1], Urmila Khobragade[1]

[1] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon – Raigad, 402-104.*

Abstract: The growing interest in natural products and plant-based compounds has led to increased research on essential oils derived from flowers due to their therapeutic, aromatic, and antimicrobial properties. The present study focuses on the extraction and phytochemical analysis of essential oil obtained from selected flowers using suitable extraction techniques. In this study, essential oils were extracted using methods such as steam distillation or solvent extraction, depending on the nature of the floral material. The obtained essential oils were then subjected to phytochemical screening to identify the presence of various bioactive compounds such as alkaloids, flavonoids, terpenoids, phenols, and essential volatile constituents. The extracted oils were further analyzed for their physical properties including color, odor, and yield percentage. Advanced analytical techniques such as FTIR (Fourier Transform Infrared Spectroscopy) were used to identify functional groups and to study the chemical composition of the essential oils. The results indicated that flower essential oils are rich in bioactive phytochemicals with significant potential in pharmaceutical, cosmetic, and aromatherapy applications. The study concludes that flower-based essential oils can serve as a natural and sustainable source of valuable phytochemicals with wide industrial applications.

Keywords: Essential Oil, Phytochemical Analysis, Flower Extraction, Steam Distillation, Bioactive Compounds, FTIR Analysis, Aromatherapy, Natural Products, Terpenoids, Flavonoids

Study Of Process Of Fermentation On Waste Water In Birwadi Village

Janhvi Mhamunkar [*1] , Asst. Prof. Shubham Yerunkar [1]
[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Wastewater pollution has become a significant environmental concern, particularly in rural areas where proper treatment facilities are often inadequate. The present study focuses on evaluating the effectiveness of the fermentation process as a biological method for the treatment of wastewater collected from Birwadi village. Fermentation involves microbial degradation of complex organic pollutants into simpler and less harmful compounds, making it an eco-friendly and cost-effective treatment approach. In this research, wastewater samples were collected and subjected to controlled fermentation conditions for a defined time period. The treatment efficiency was monitored using spectroscopic techniques such as UV–Visible spectrophotometry and Fourier Transform Infrared (FTIR) spectroscopy. UV–Visible analysis was performed at selected wavelengths to observe variations in absorbance values, which indicate the concentration of organic matter present in the samples. A gradual decrease in absorbance values during the fermentation period is expected to demonstrate effective degradation of biodegradable pollutants. FTIR spectral analysis was carried out to identify changes in functional groups before and after fermentation. Reduction or modification in peaks corresponding to hydroxyl, carbonyl, and amine groups may confirm biochemical transformations occurring during microbial activity. The integration of these analytical techniques helps in understanding the progress and efficiency of the fermentation process. Overall, the study aims to validate fermentation as a simple, sustainable, and low-cost wastewater treatment method suitable for rural communities. The findings are expected to contribute valuable baseline data for future environmental management and decentralized wastewater treatment strategies.

Keywords: Wastewater, Fermentation, UV–Visible Spectrophotometry, FTIR Spectroscopy, Organic Matter Degradation, Rural Wastewater Treatment Biodegradation, Environmental Pollution.

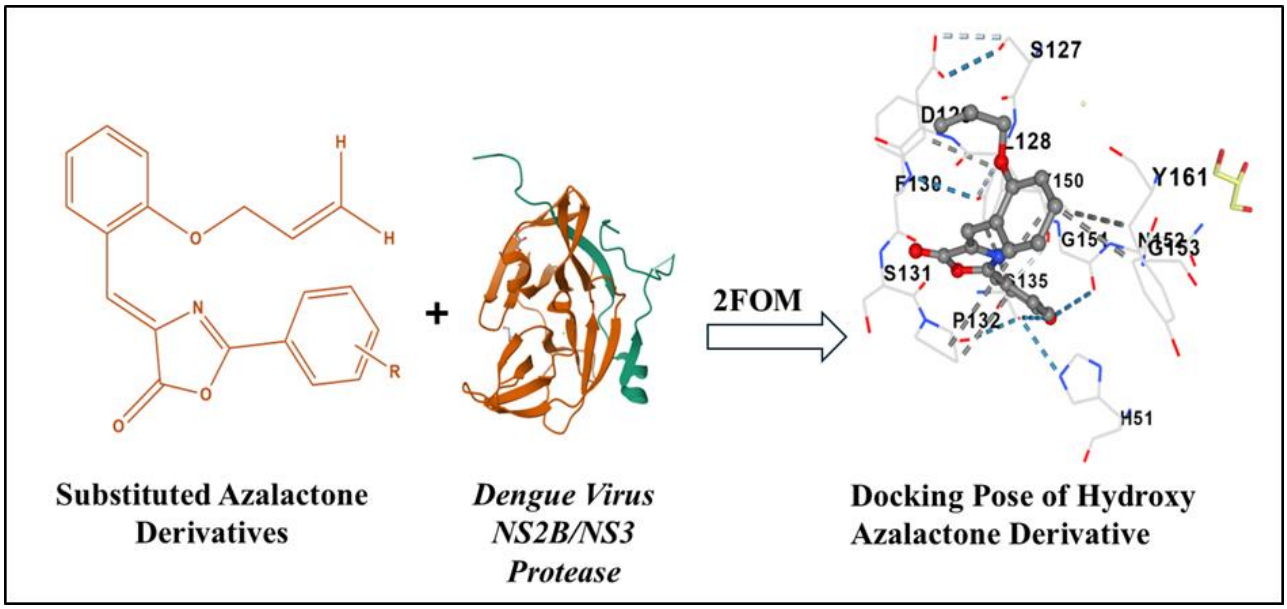
Azlactone derivatives as potential dengue virus protease inhibitors in silico

Prasanna B. Ranade*, Dinesh N. Navale, Manoj Yadav

Department of Chemistry, Vivekanand Education Society's College of Arts, Science and Commerce (Autonomous), Sindhi Society, Chembur, Mumbai 400 071, Maharashtra, India

Abstract: A mosquito-borne flaviviral dengue fever is a worldwide challenge. This is mainly due to lack of drugs against dengue fever and any effective therapy. Molecular docking, in vitro and in vivo analysis boosting the medicinal chemistry of dengue. To identify the potential anti dengue compounds virtual screening is carried out using molecular docking. In this work, the docking between azlactone derivatives against dengue virus protease was carried out using CB dock web server. Azlactone derivatives were subjected to molecular docking against dengue virus protease. The docking results of azlactone are comparable with ribavirin, chloroquine, primaquine, panduratin, quercetin etc. The binding of azlactone with Tyr150,Gly 151, Asn152 etc by hydrogen bonding and with Ser135, one of catalytic triad of dengue virus protease demonstrate potential anti dengue characteristics in silico.

The ADME results are in acceptable range



Keywords: Docking, Dengue, Protease, 2FOM, Azalactone derivatives, Amino acids.

Green Synthesis of Copper Oxide Nanoparticle's Using Carica Papaya Plant Extract and its Characterization-A review

Payal P. Gaikar [1], Aditi A. Jadhav [1], Kaustubh P. Risbud *[1]

[1] Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.

Abstract

The green synthesis of copper oxide nanoparticles (CuO NPs) presents a sustainable alternative to traditional chemical and physical methods, utilizing plant biomolecules to reduce metal salts and stabilize resultant nanostructures. Carica papaya, a widely available tropical plant, offers a remarkable source of bioactive phytochemicals such as flavonoids, polyphenols, and alkaloids, which act synergistically to facilitate nanoparticle nucleation and growth. This review aggregates comprehensive findings spanning synthesis protocols, physicochemical characterization, and diverse applications including photocatalytic dye degradation, antimicrobial activity, and environmental remediation. Key achievements include controlled particle size (8-30 nm), enhanced surface areas, and prominent bioactivity, making Carica papaya-derived CuO NPs promising for eco-friendly nanotechnology. Current methodological challenges involve extract variability, nanoparticle aggregation, and scale-up reproducibility. The review concludes with future directions emphasizing mechanistic elucidation, bio-waste valorization, and nano-bio interface optimization for diverse applications.

Keywords:

Carica papaya plant extract, Copper oxide nanoparticles, Green synthesis, Photocatalysis, antimicrobial.

Biogenic Fabrication of Vanadium Oxide Nanoparticles via Aloe barbadensis: A Comprehensive Review on Synthesis and Characterization

Ayesha Z. Tol[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Synthesis of metal nanoparticles using plant extracts is one of the most simple, convenient, economical, and environmental friendly methods that reduces the involvement of toxic chemicals. This review involves the green synthesis and Characterization of Vanadium Oxide(V_2O_5) nanoparticles using aqueous leaf extract of the plant Aloe barbadensis (Aloe vera).Aloe vera contains over 75 active compounds, including polysaccharides, anthraquinones, enzymes, vitamins, and amino acids that provide antioxidant, anti-inflammatory, and antimicrobial properties. These compounds, found in the gel and latex, support wound healing, skin health, and immune function. The key factors affecting the synthesis controlling size, shape, and stability include pH, reaction temperature, concentration of the extract, and type of Vanadium precursor. The synthesis process was confirmed and characterized using several analytical techniques like UV-Vis Spectroscopy for confirmation of formation of V_2O_5 nanoparticles, XRD (X-ray Diffraction) for detection of crystalline nature, FTIR (Fourier Transform Infrared Spectroscopy) for functional group analysis, SEM/TEM (Scanning/Transmission Electron Microscopy) for morphological assessment. The biosynthesized V_2O_5 NPs demonstrated notable antibacterial and antioxidant activities, suggesting use in targeted drug delivery or antimicrobial coatings and enhanced electrochemical properties suitable for supercapacitor electrodes. Additionally, the particles exhibited notable catalytic efficiency in the degradation of organic dyes.These results indicate the use of Aloe vera extract provides a rapid, "green" route for producing high-quality V_2O_5 nanoparticles, supporting the shift toward circular chemistry and sustainable nanotechnology.

Keywords: Green synthesis, Aloe barbadensis, Biogenic fabrication, Phytochemicals, Catalytic activity, Environmental applications, Sustainable nanotechnology.

To Detect (qualitative analysis) and estimate (quantitative analysis) the amount of phosphate ions (PO_4^{3-}) present in different brands of cold drinks.

Sanavi S. Ghadwale[*1],Tahsin Rawoot [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

ABSTRACT: Phosphate ions (PO_4^{3-}), commonly present in carbonated beverages as phosphoric acid, play an important role as acidulants and flavoring agents. However, excessive dietary intake of phosphates has been associated with adverse health effects, including impaired calcium metabolism, reduced bone mineral density, and increased risk of kidney disorders. In this context, accurate determination of phosphate content in widely consumed cold drinks is essential for both nutritional assessment and public health monitoring. The present study aims to perform both qualitative detection and quantitative estimation of phosphate ions in selected commercial cold drink samples. Qualitative analysis was carried out using the ammonium molybdate test under acidic conditions, confirming the presence of phosphate ions via the formation of a characteristic yellow precipitate of ammonium phosphomolybdate. Quantitative estimation was conducted using the molybdenum blue spectrophotometric method, based on the reduction of phosphomolybdic acid to a blue-colored complex, with absorbance measured at 880 nm. A series of standard phosphate solutions were prepared to construct a calibration curve, ensuring accurate determination of phosphate concentrations in the samples. The analysis revealed that all tested beverages contained detectable levels of phosphate, with significant variation among brands. The observed concentrations were compared with permissible dietary intake levels and discussed in terms of potential health implications. The method employed was found to be simple, sensitive, and reproducible, making it suitable for routine analysis of phosphate in beverages. This study underscores the necessity for continuous monitoring and regulation of phosphate additives in soft drinks to ensure consumer safety.

KEYWORDS :Phosphate ions (PO_4^{3-}),Qualitative analysis,Quantitative estimation,Cold drinks / Soft drinks, Spectrophotometry, Molybdenum blue method,Calibration curve, Absorbance measurement,Acid digestion,Food additives,Phosphoric acid,Beverage chemistry,Analytical chemistry,Standard solution,Reagent preparation,Concentration determination,Quality control

Efficient Synthesis & Bioassay of New Semi-carbazone & Metal Complexes Using Green Methods

Payal Bhonkar [*1], Dr. Namita More [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The development of eco-friendly synthetic methodologies has become a central focus in modern medicinal and coordination chemistry. In the present study, an efficient and green approach was employed for the synthesis of novel semicarbazone derivatives and their corresponding metal complexes. The synthesis was carried out using environmentally benign conditions, such as solvent-free techniques and the use of UV-Visible, IR, NMR, minimizing hazardous waste and energy consumption. The synthesized semicarbazones were subsequently complexed with selected transition metal ions to enhance their chemical and biological properties. All compounds were characterized using various spectroscopic and analytical techniques, including UV-Visible, IR, NMR, and elemental analysis, confirming their structures and coordination behavior. The biological potential of the synthesized compounds was evaluated through in vitro bioassays, including antimicrobial and antioxidant studies. The results indicated that the metal complexes exhibited significantly improved biological activity compared to the parent semicarbazone ligands, suggesting a synergistic effect of metal coordination. Overall, this study highlights a sustainable and efficient synthetic route for the development of biologically active semicarbazone-based metal complexes, with promising applications in pharmaceutical and biomedical fields.

Keywords: API, semicarbazone ligands, UV-Visible, IR, NMR, UV-Visible, IR, NMR

Determination of the percentage of sodium bisulphate in different commercially available fruit juice samples (pH meter, Turbidimetry, UV spectroscopy)

Sanika Ramesh Kadam[*1], Ankita D. Mhaske [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The present study focuses on the determination of the percentage of sodium bisulphate present in different commercially available fruit juice samples using analytical techniques such as pH metry, turbidimetry, and UV spectroscopy. Sodium bisulphate is commonly used as an acidulant and preservative in fruit juices, but its concentration must be monitored to ensure product safety and quality. In this study, various fruit juice samples were collected and analyzed. The pH meter was used to measure the acidity level of the samples, providing an indirect estimation of sodium bisulphate content. Turbidimetric analysis was carried out by reacting the sulphate ions with barium chloride to form a precipitate of barium sulphate, and the resulting turbidity was measured. UV spectroscopy was employed to determine the absorbance of the samples, and the concentration of sodium bisulphate was calculated using calibration curves based on Beer-Lambert's law. The results obtained from the three methods were compared to evaluate their accuracy and reliability. The study highlights the effectiveness of these analytical techniques in determining sodium bisulphate concentration and ensures that the levels present in fruit juices are within permissible limits. This analysis is important for maintaining food safety standards and protecting consumer health.

Keywords: Sodium bisulphate,Fruit juice analysis,pH meter,Turbidimetry,UV spectroscopy,Beer-Lambert Law,Sulphate estimation,Food preservatives,Quantitative analysis,Barium sulphate precipitation,Absorbance

A Comprehensive Review on Synthesize Organic Corrosion Inhibitors and Evaluate their Effectiveness on Mild Steel in Acidic Media

Surbhi M Ambekar [*1], Vishakha Pawar [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Corrosion of mild steel in acidic media is a major industrial concern, particularly in processes such as pickling, acid cleaning, and oil well acidification. The use of organic corrosion inhibitors is an effective and economical method to mitigate metal degradation. This study focuses on the synthesis of novel organic corrosion inhibitors and the evaluation of their inhibitory performance on mild steel in acidic environments. Organic compounds containing heteroatoms such as nitrogen, oxygen, and sulfur, along with π-electron systems, were synthesized using standard laboratory techniques. The synthesized inhibitors were characterized using spectroscopic methods such as where applicable, NMR to confirm their molecular structures. The corrosion inhibition efficiency was evaluated using weight loss measurements, electrochemical techniques. Experiments were conducted in acidic media, typically hydrochloric acid at varying inhibitor concentrations and temperatures. The results demonstrated that inhibition efficiency increased with increasing inhibitor concentration, indicating strong adsorption of inhibitor molecules onto the mild steel surface. Adsorption behavior was analyzed using isotherm models such as Langmuir adsorption isotherm, suggesting monolayer adsorption. Thermodynamic parameters indicated that the adsorption process involved both physical and chemical interactions. Electrochemical studies revealed that the synthesized inhibitors acted as mixed-type inhibitors, reducing both anodic metal dissolution and cathodic hydrogen evolution reactions. Surface morphology analysis using techniques like scanning electron microscopy (SEM) confirmed the formation of a protective film on the mild steel surface in the presence of inhibitors. Overall, the study concludes that the synthesized organic compounds exhibit significant corrosion inhibition efficiency and can serve as effective, low-cost, and environmentally friendly alternatives for corrosion protection in acidic media. This research contributes to the development of advanced corrosion control strategies in industrial applications.

Keywords: Corrosion inhibition, Mild steel, Acidic media, Organic inhibitors, Hydrochloric acid, Adsorption isotherm, Langmuir adsorption

A comprehensive study on a water based extraction and photodynamic study of bioactive pesticidal compounds from papaya seeds

Taqdees M. A. Sangey [*1], Urmila Khobragade[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The study aims to investigate the potential of papaya seeds (Carica papaya) as a natural, eco-friendly source of pesticidal compounds and to evaluate their effectiveness through aqueous extraction and photodynamic analysis.In recent years, the excessive use of synthetic pesticides has led to serious environmental and health concerns, including soil degradation, water pollution, and harmful effects on non-target organisms. Therefore, there is an increasing need to develop sustainable and biodegradable alternatives. Papaya seeds, often considered as agricultural waste, are rich in bioactive compounds such as alkaloids, flavonoids, phenols, tannins, and saponins, which possess strong pesticidal and antimicrobial properties. In this study, a water-based extraction method was adopted due to its simplicity, cost-effectiveness, and non-toxic nature. The powdered papaya seeds were subjected to aqueous extraction under controlled conditions to obtain the crude extract. The extract was then analyzed for its phytochemical constituents using standard qualitative tests. Furthermore, its pesticidal activity was evaluated against selected insect pests under laboratory conditions. A significant aspect of this research is the photodynamic study, which involves examining the effect of light on the activity and stability of the extracted compounds. The results demonstrated that exposure to light enhances the pesticidal efficiency of certain bioactive components, indicating their potential for use in light-activated pest control systems. This finding suggests that such compounds could be effectively utilized in field conditions where sunlight can act as a natural activator. The overall findings of the study confirm that papaya seed extracts exhibit considerable pesticidal activity and can serve as a promising alternative to conventional chemical pesticides. The use of water as a solvent further supports the concept of green chemistry by minimizing environmental hazards and promoting sustainable agricultural practices. In conclusion, this research emphasizes the importance of utilizing natural resources and waste materials for the development of eco-friendly pest management strategies, thereby contributing to environmental conservation and sustainable development.

Keywords: Carica papaya (papaya seeds), water-based extraction, bioactive compounds, natural pesticides, phytochemical analysis, photodynamic study

Green Synthesis and Characterization of CdS Nanoparticles Using Curry Leaves (*Murraya Koenigii)* Extract: A Comprehensive Review

Afreen A.Gazge[1], Asst. Prof. Mehreen M. Dawre[1]
[1] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Nanotechnology involves the design and manipulation of materials at the nanoscale (1–100 nm), where unique physicochemical properties such as enhanced surface area, optical behavior, and reactivity emerge compared to bulk materials. Conventional methods for nanoparticle synthesis, including physical and chemical approaches, often involve hazardous reagents and high energy consumption, raising environmental concerns. As a result, green synthesis has gained significant attention as an eco-friendly and sustainable alternative, utilizing biological resources like plant extracts as reducing, stabilizing, and capping agents. Among various plant-based approaches, *Murraya koenigii* (curry leaves) has been widely explored due to its rich phytochemical composition, including alkaloids, flavonoids, and phenolic compounds. These bioactive constituents facilitate the efficient synthesis and stabilization of nanoparticles. Additionally, the year-round availability and medicinal significance of *Murraya koenigii* make it a reliable and sustainable choice for green synthesis. Recent studies have demonstrated the successful biosynthesis of cadmium sulfide (CdS) nanoparticles using *Murraya koenigii* leaf extract, showing rapid formation and effective stabilization in solution. The synthesized nanoparticles are typically characterized using techniques such as X-ray diffraction (XRD) for crystallinity, Fourier transform infrared spectroscopy (FTIR) for functional group analysis, and UV–visible spectroscopy for optical properties and band gap evaluation. Furthermore, green-synthesized CdS nanoparticles exhibit notable antibacterial activity against various pathogens, indicating their potential in biomedical applications. Their eco-friendly nature, cost-effectiveness, and scalability also make them suitable for environmental applications, including domestic wastewater treatment. Overall, plant-mediated synthesis using *Murraya koenigii* offers a promising, sustainable approach for producing functional nanomaterials.

Keywords: CdS Nanoparticles, Phytochemicals, eco-friendly, Biogenic, antibacterial activity, sustainable.

Green Synthesis And Characterization of Iron Nanoparticles Using Plant Extract

Sakshi Mundhe [1], Dhanshree More [1], Surbhi R Thakkur*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract: Green synthesis of nanoparticles has gained significant attention due to its eco-friendly, cost-effective, and sustainable nature compared to conventional chemical and physical methods. In this study, iron nanoparticles were synthesized using neem (Azadirachta indica) leaf extract, which serves as a natural reducing and stabilizing agent owing to the presence of bioactive phytochemicals such as flavonoids, polyphenols, terpenoids, and alkaloids . Plant-mediated synthesis avoids the use of toxic chemicals and high-energy processes, making it suitable for environmental and biomedical applications. The synthesized iron nanoparticles were characterized using analytical techniques such as UV–Visible spectroscopy, Fourier Transform Infrared Spectroscopy (FTIR), X-ray Diffraction (XRD), and Scanning/Transmission Electron Microscopy (SEM/TEM) to confirm nanoparticle formation, functional groups, crystalline structure, size, and morphology. Previous studies report that neem-mediated iron nanoparticles are mostly spherical, crystalline, and stable in nature .These nanoparticles exhibit promising applications in wastewater treatment, dye degradation, antimicrobial activity, and environmental remediation .Thus, green synthesis using neem extract provides a sustainable pathway for the development of functional iron nanoparticles with wide-ranging applications.

Keywords : Green synthesis, Iron nanoparticles (FeNPs), Azadirachta indica (Neem),Plant extract, Phytochemicals, Eco-friendly, nanotechnology

Determination of Saccharin in Commercially Available Sugar-Free Chocolates (Amul Sugar Free VS Sugar Free D'Lite-Comparison) Using TLC and UV–Visible Spectrophotometer

Sanika Surykant Kadam [*1], Ankita Mhaske[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract:

Artificial sweeteners play a significant role in modern food technology, especially for individuals suffering from diabetes and those who prefer low-calorie diets. Among various artificial sweeteners, saccharin is one of the oldest and most commonly used non-nutritive sweeteners due to its high sweetness intensity, stability under different conditions, and cost-effectiveness. With the increasing demand for sugar-free products, especially chocolates, it becomes important to analyze and monitor the saccharin content present in such food items to ensure their safety, quality, and compliance with regulatory standards. The present study focuses on the determination and comparative analysis of saccharin in commercially available sugar-free chocolates, specifically Amul Sugar Free and Sugar Free D'Lite. The analysis is carried out using Thin Layer Chromatography (TLC) and UV–Visible Spectrophotometry. Thin Layer Chromatography is used for qualitative analysis by comparing Rf values, while UV–Visible spectrophotometry is used for quantitative estimation based on absorbance and calibration curve. The chocolate samples are powdered, extracted, filtered, and analyzed. The comparative study helps identify variation in saccharin content between brands. Overall, TLC and UV–Visible spectrophotometry are simple, reliable, and economical techniques for saccharin determination in food products.

Keywords: Saccharin, Sugar-Free Chocolates, TLC, UV–Visible Spectrophotometry, Food Analysis

A Comprehensive study of Green Synthesis of Iron Nanoparticles using Justicia Adhatoda (adulsa) and their characterization by FTIR and X-ray diffraction method

Purva A. Khadtar [*1], Shubham Yerunkar [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The present study investigates a sustainable and eco-friendly approach for the synthesis of iron nanoparticles (FeNPs) using leaf extract of Adhatoda vasica, a well-known medicinal plant rich in bioactive phytochemicals. Nanotechnology has gained immense importance due to its diverse applications in biomedical, environmental, and industrial fields, with iron nanoparticles being particularly valuable because of their magnetic properties, catalytic efficiency, high surface area, and biocompatibility. However, conventional methods of nanoparticle synthesis involve toxic reagents, high energy consumption, and environmental hazards. This has led to the development of green synthesis methods that utilize plant-based materials as natural reducing and stabilizing agents.In this study, aqueous leaf extract of Adhatoda vasica was prepared and employed for the reduction of ferric ions (Fe^{3+}) from ferric chloride solution into iron nanoparticles. The synthesis process was indicated by a distinct color change, confirming nanoparticle formation. The phytochemicals present in the plant extract, such as flavonoids, alkaloids, phenolic compounds, and terpenoids, played a dual role in reducing metal ions and stabilizing the formed nanoparticles, thus eliminating the need for additional chemical agents. The study was conducted with experiments performed in triplicates, and statistical analysis including mean and standard deviation was applied to ensure reliability of results. Despite some limitations such as possible nanoparticle aggregation and variation in particle size, the results confirm the successful synthesis of stable iron nanoparticles using a green route. Overall, this research highlights the potential of Adhatoda vasica as an effective biological resource for nanoparticle synthesis and establishes a simple, cost-effective, and environmentally benign method. The synthesized iron nanoparticles show promising applications in areas such as drug delivery, environmental remediation, catalysis, and antimicrobial activity. This work contributes to the advancement of green nanotechnology and promotes the use of plant-based systems for sustainable material synthesis.

Keywords: Green Nanotechnology, Adhatoda vasica, Iron Nanoparticles (FeNPs), Plant-mediated synthesis, Fourier Transform Infrared Spectroscopy, X-ray Diffraction, Phytochemicals, Eco-friendly synthesis, Crystalline structure, Nanomaterials.

Green Synthesis and Characterization of CdS Nanoparticles Using Zingiber Officinale Extract: A Comprehensive Review

Zainab A.A. Ukaye [*1], Asst. Prof. Mehreen M. Dawre[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: Green synthesis of nanoparticles is an eco-friendly, cost-effective method utilizing biological resources like plant extracts, bacteria, or fungi to reduce metal ions into nanoparticles. It replaces toxic chemicals with natural agents, producing stable, biocompatible, and smaller nanoparticles for biomedical and environmental applications. This review focuses on the biosynthesis and characterization of cadmium sulfide(CdS) nanoparticles using aqueous extract of Zingiber Officinale (Ginger). The green synthesis of cadmium sulfide nanoparticles (CdS NPs) using ginger (Zingiber officinale) extract is a sustainable "bottom-up" approach that uses plant bioactive compounds as both reducing and capping agents. This method eliminates the need for hazardous chemicals and produces stable, crystalline nanoparticles. Compared to conventional chemical and physical methods, this green synthesis approach offers advantages including cost-effectiveness, simplicity, and the avoidance of toxic reagents. The review critically analyses essential factors affecting nanoparticle synthesis, including pH, temperature, reaction duration, and extract concentration, which significantly influence particle size, morphology, and yield. The characterization of cadmium sulfide (CdS) nanoparticles synthesized using ginger involves several analytical techniques to confirm their formation, purity, size, and structural properties. Key methods include UV-Visible Spectroscopy, X-ray Diffraction (XRD), Fourier Transform Infrared (FTIR) Spectroscopy, and Electron Microscopy (SEM/TEM). CdS nanoparticles demonstrate significant potential in diverse biological and industrial applications, including anticancer & cytotoxicity, antimicrobial & antifungal activities, photocatalysis properties, reducing agents and capping & stabilizing agents. Overall Green-synthesized CdS nanoparticles using ginger extract have significant applications in environmental protection, particularly in water treatment, wastewater remediation, and sustainable agriculture.

Keywords: Green synthesis, Cadmium sulfide, Zingiber officinale extract, Plant-mediated, Phytochemicals, Eco-friendly, Biogenic.

PRELIMINARY PHYTOCHEMICAL SCREENING AND FTIR ANALYSIS OF SADAFULI (CATHARANTHUS ROSEUS (L.) PLANT EXTRACT

Dnyaneshwar Shinde[1], Pankaj Gaikwad[*1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: Phytochemicals are derived from various parts of plants such as leaves, flowers and stem by Maceration extraction. In maceration grind plant is kept in contact with the solvent in stoppered container for a defined period with frequent agitation until soluble matter is dissolved. The maceration extraction was performed using aqueous, acetone and methanol as solvent. The result of each extract confirms the active substances such as carbohydrates, reducing sugar, proteins and Amino acids, flavonoids, phenolic compounds, tannin, coumarins, quinones. FTIR analysis was used to identify the functional groups of the compound and indicates the presence of functional groups such as phenol, alkanes, lipids, ester, ethers, alkyl halide in the Catharanthus roseus stem extract of acetone sample. Catharanthus roseus represents a reservoir of over 130 medicinally important alkaloids, many of which are currently in therapeutic use. It is one of the most extensively investigated medicinal plants and has acquired the status of a model non-model plant due to many decades of active research conducted upon it by various groups across the globe. Nevertheless, the plant still remains an enigma due to gaps in the understanding of the biosynthesis of pharmacologically important terpenoid indole alkaloids (TIAs) coupled with extremely low content of the potent anticancer bisindole alkaloids, vincristine and vinblastine. Genomic and transcriptomic resources have been generated for the plant, but their full exploitation is yet to be achieved. This chapter will provide an overview of the research potential with respect to C. roseus and also elaborate upon the future prospects for research on the plant in terms of the gaps to be filled.

Keywords: Catharanthus roseus(L), Phytochemicals, Apocynaceae, Maceration extraction, FTIR.

COMPARATIVE STUDY ON SYNTHESIS OF ANISOLE (METHOXYBENZENE) FROM PHENOL USING CONVENTIONAL WILLIAMSON ETHER SYNTHESIS ANS GREEN CHEMISTRY APPROACHES

Rushda Zubair Sange [*1], Urmila Kharbragade[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: This study presents a comparative investigation of the synthesis of anisole (methoxybenzene) from phenol using conventional Williamson ether synthesis and green chemistry approaches. The conventional method involves base-catalyzed O-methylation under reflux conditions, which, although effective, requires prolonged reaction time, high energy input, and the use of hazardous reagents. To address these limitations, green synthesis techniques such as microwave-assisted and light-assisted (photochemical) methods were explored as sustainable alternatives. The microwave-assisted method enables rapid and uniform heating, significantly reducing reaction time and improving yield while minimizing solvent usage. Similarly, the light-assisted approach utilizes ultraviolet or visible light as a clean energy source, allowing the reaction to proceed under mild conditions with lower energy consumption and reduced environmental impact. All three methods were systematically compared based on parameters such as reaction time, percentage yield, energy efficiency, and environmental friendliness. The results indicate that green chemistry approaches, particularly microwave-assisted synthesis, offer superior efficiency with reduced reaction time and improved sustainability compared to the conventional method. Light-assisted synthesis also demonstrates promising results under mild conditions. The synthesized anisole was characterized using standard analytical techniques such as IR and NMR spectroscopy to confirm its structure and purity. Overall, this study highlights the potential of green chemistry methodologies to replace traditional etherification processes, promoting safer, energy-efficient, and environmentally benign practices in organic synthesis.

Keywords: Anisole, Phenol, Williamson Ether Synthesis, Green Chemistry, Microwave, Assisted Synthesis,Photochemical Synthesis, Etherification, O-Methylation, Sustainable Chemistry, Organic Synthesis.

Preparation Of Albendazole Product

Rohan K. Jangam[1], Ankita Mhaske*[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: Albendazole is a broad-spectrum anthelmintic drug widely used for the treatment of parasitic worm infections in humans and animals. The present study focuses on the laboratory-scale preparation of Albendazole through a multi-step synthetic process. The synthesis involves the formation of a benzimidazole nucleus, followed by the introduction of a carbamate functional group, which is essential for its pharmacological activity. Key steps include the reaction of appropriate substituted o-phenylenediamine derivatives with carbon disulfide and subsequent alkylation and oxidation processes. The prepared compound was purified using recrystallization techniques and characterized by standard analytical methods such as melting point determination and spectroscopic analysis. The yield and purity of the final product were evaluated to assess the efficiency of the synthesis. The study demonstrates an effective method for the preparation of Albendazole and highlights important reaction conditions influencing product formation.

Keyword: Albendazole, oxidation, recrystallization, parasitic worm

K4[FE(CN)6] CATALYZED SYNTHESIS OF BENZIMIDAZOLES AND BENZOXAZOLES UNDER SOLVENT FREE CONDITION

Shweta Vilas Talkar1, Pankaj Gaikwad*1

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Benzimidazoles and benzoxazoles are very useful intermediates or subunits for the development of molecules of pharmaceutical or biological interest. Benzoxazole and benzimidazole moieties have attracted special attention in chemistry and biochemistry. These heterocycles show various pharmaceutical properties such as antiviral, antibiotic, antibacterial, antifungal, anticancer, antitumor and anti-inflammatory activities. In the present study, Benzimidazoles and benzoxazoles have been efficiently synthesized in high yields by treatment of different aldehydes with o-phenylene diamine and o-hydroxy phenol respectively using the metal co-ordinate complex K4[Fe(CN)6] as a catalyst. The method was carried out under solvent free condition via oxidation of carbon-nitrogen bond. The process is green and cost effective.

Keywords: Benzimidazoles, benzoxazoles, K4[Fe(CN)6], solvent free.

Development of an Herbal-Based Liquid Body Cleanser with Antimicrobial Properties

Dr. Namita A. More[*1], Prachiti Deokule[1], Pranjali Ambavale[1], Vaishnavi Ratwadkar[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Graphical Abstract: Herbal-Based Liquid Body Cleanser

Abstract: The purpose of this study is to develop a herbal body wash utilizing powdered extracts of Ocimum tenuiflorum (tulsi) and Azadirachta indica (neem). This composition strives to integrate botanical materials that are deeply rooted in traditional medicine practices with minimal side effects, as Ayurvedic cosmetics are becoming more and more popular due to their natural ingredients. Neem, which is well-known for its medicinal properties, is important. Its anti-inflammatory, antihyperglycemic, antimalarial, and antibacterial properties make it noteworthy. A comprehensive technique is used in the study to examine the effects of various extracts from neem leaves. Neem and Tulsi are used in the carefully made herbal soap, which shows particular effectiveness against dermatophytes while Tulsi has exceptional antiviral qualities. This study highlights the enormous potential of herbal formulations by illuminating the many advantages of neem and tulsi as well as their revolutionary uses in cosmetic products.

Keywords: Ocimum tenuiflorum, Azadirachta indica, Anti-inflammatory, Antihyperglycemic, Antimalarial, Antibacterial

Recent Advances in the Synthesis, Characterization, and Applications of Iron Oxide Nanoparticles: A Review

Mehreen M. Dawre*[1], Sachin V. Bangale[2], Amol Rajpurkar[3]

[1]*People's Education Society's Dr. Babasaheb Ambedkar College of Arts, Science & Commerce, Mahad- Raigad, 402-301.*

[2,3,] *Chemical Research lab, Department of Chemistry,G.M. Vedak College of Science, Tala-Raigad, Maharashtra, India.*

Abstract: Iron oxide nanoparticles (IONPs) have attracted significant attention in recent years due to their unique physicochemical properties, including superparamagnetic, high surface area, and biocompatibility. This review highlights recent advances in the synthesis, characterization, and diverse applications of iron oxide nanoparticles. Various synthesis approaches, including chemical, physical, and green methods, are discussed, with particular emphasis on eco-friendly, plant-mediated techniques that offer sustainable and cost-effective alternatives to conventional processes. These methods enable better control over particle size, morphology, and surface properties. Characterization techniques such as X-ray diffraction (XRD), transmission electron microscopy (TEM), scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FTIR), and vibrating sample magnetometry (VSM) are reviewed for their roles in determining structural, morphological, and magnetic properties of nanoparticles. Advances in these analytical tools have significantly improved the understanding and optimization of IONPs. Furthermore, the review explores a wide range of applications, including biomedical fields (drug delivery, magnetic resonance imaging, and hyperthermia), environmental remediation, catalysis, and sensing technologies. The growing integration of green synthesis with advanced functional applications highlights the potential of IONPs in sustainable nanotechnology. Overall, this review provides a comprehensive overview of current trends and future perspectives in iron oxide nanoparticle research.

Keywords: Iron oxide, Green synthesis, Nanoparticle characterization, Drug delivery, Catalysis, Sustainable nanomaterials

SYNTHESIS AND CHARACTERIZATION OF ECO-FRIENDLY COPPER(II)–NATURAL LIGAND COMPLEX AS A GREEN PIGMENT

Prerana Prakash Shirke [*1], Asst. Prof. Pankaj Gaikwad[1]

1D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract:

This study focuses on the synthesis and characterization of eco-friendly Copper (II)–natural ligand complexes and their application as green pigments in textile industries. With increasing environmental concerns regarding the use of toxic and non-biodegradable synthetic pigments, the development of sustainable alternatives has become essential. In this research, Copper (II) ions are combined with naturally derived ligands such as amino acids or organic acids to form stable coordination complexes using green chemistry principles. The synthesis is carried out under mild and eco-friendly conditions, minimizing the use of hazardous chemicals and solvents. The prepared complexes are characterized using analytical techniques such as UV– Visible spectroscopy and FT-IR spectroscopy to confirm metal–ligand coordination and study their structural and electronic properties.The color characteristics, stability under different environmental conditions (light, temperature, and pH), and pigment performance are also evaluated. The results are expected to demonstrate that Copper (II)– natural ligand complexes exhibit desirable green coloration, good stability, and potential applicability as eco-friendly pigments. This work highlights the importance of renewable resources and sustainable chemical processes in developing environmentally responsible materials for industrial applications, especially in textile and coating industries.

Keywords:

Copper (II) complexes, Natural ligands, green pigment, Eco-friendly synthesis, green chemistry, Coordination compounds, UV–Visible spectroscopy, FT-IR spectroscopy, Textile application, Sustainable materials.

A Comprehensive Review on GC–MS Analysis of Aldehydes and Ketones in Edible Oils

Siddhi S. Bhonkar[*1], Vishakha Pawar[*1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Edible oils are essential components of the human diet, but their quality and safety are significantly influenced by the presence of volatile carbonyl compounds, particularly aldehydes and ketones. These compounds are primarily formed through lipid oxidation during processing, storage, and thermal treatment, and are closely associated with flavor deterioration, rancidity, and potential health risks**. Gas chromatography–mass spectrometry (GC–MS)** has emerged as a powerful and reliable analytical technique for the identification and quantification of these volatile compounds due to its high sensitivity, selectivity, and accuracy. This review provides a comprehensive overview of GC–MS-based methodologies for the analysis of aldehydes and ketones in edible oils. Key aspects such as sample preparation techniques, including solid-phase microextraction (SPME) and derivatization methods, are discussed in detail. The review also highlights the major aldehydes and ketones commonly detected in various edible oils and their role as indicators of oxidative degradation and oil quality. Furthermore, recent advancements in GC–MS technologies and their applications in monitoring oil stability, authenticity, and shelf life are critically examined. Challenges related to compound volatility, matrix complexity, and analytical limitations are also addressed. Overall, this review emphasizes the significance of GC–MS as an indispensable tool in food quality assessment and provides insights into future directions for improving analytical precision and reliability in edible oil research.

Keywords: GC–MS, Edible oils, Aldehydes, Ketones, Lipid oxidation, Food quality; Oxidative stability, Oil deterioration, Analytical techniques.

PREPARATION OF ACTIVATED CARBON FROM BANANA PEEL AND ITS APPLICATION IN DYE ADSORPTION

Sumreen K. Kondwilkar [*1], Ankita Mhaske [1]
[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: This study focuses on the preparation of activated carbon from banana peel, an abundant and low-cost agricultural waste, and its application in the removal of synthetic dyes from wastewater through adsorption. The objective is to develop an eco-friendly and sustainable alternative to conventional activated carbon derived from non-renewable sources. Banana peels, rich in lignocellulosic components, were subjected to controlled carbonization and activation processes to obtain a highly porous adsorbent with enhanced surface area and functional groups.The adsorption performance of the prepared activated carbon was evaluated using dyes such as methylene blue, rhodamine B, and Congo red. Batch adsorption experiments were conducted to examine the effects of parameters including pH, contact time, adsorbent dosage, temperature, and initial dye concentration. Adsorption behavior was analyzed using isotherm models (Langmuir and Freundlich) and kinetic models (pseudo-first-order and pseudo-second-order) to understand the adsorption mechanism thermodynamic parameters were also determined to assess the feasibility and nature of the process. The results indicate that banana peel-derived activated carbon is an efficient, low-cost, and sustainable adsorbent, offering significant potential for wastewater treatment and environmental remediation.

Keywords:. Banana Peel–Derived Activated Carbon, Adsorption Isotherms, Kinetics, Thermodynamics, Biomass Valorization, Wastewater Treatment, Surface Functionalization.

A Comprehensive Review on a Saponification for preparation of soaps by using kokum oil

Anket Karkare[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Saponification is a chemical process involving the hydrolysis of triglycerides (fats or oils) in the presence of a strong alkali to produce soap and glycerol. This study focuses on the preparation of soap using kokum oil, a natural fat extracted from the seeds of *Garcinia indica*. Kokum oil is rich in saturated fatty acids, particularly stearic and oleic acids, which contribute to the hardness and moisturizing properties of the final soap product. In this process, kokum oil is reacted with a suitable alkali such as sodium hydroxide (NaOH) under controlled conditions. The triglycerides present in the oil undergo alkaline hydrolysis, yielding sodium salts of fatty acids (soap) and glycerol as a by-product. The reaction mixture is stirred and heated to ensure complete saponification, followed by cooling and molding into desired shapes. The soap produced using kokum oil demonstrates desirable qualities such as firmness, smooth texture, and enhanced skin-conditioning properties due to its emollient nature. Additionally, kokum oil-based soaps are considered environmentally friendly and beneficial for dry or sensitive skin. This study highlights the potential of kokum oil as an effective and sustainable raw material for high-quality soap production through the saponification process.

Keywords: Saponification, hydrolysis of triglycerides, *Garcinia indica*, glycerol, emollient nature.

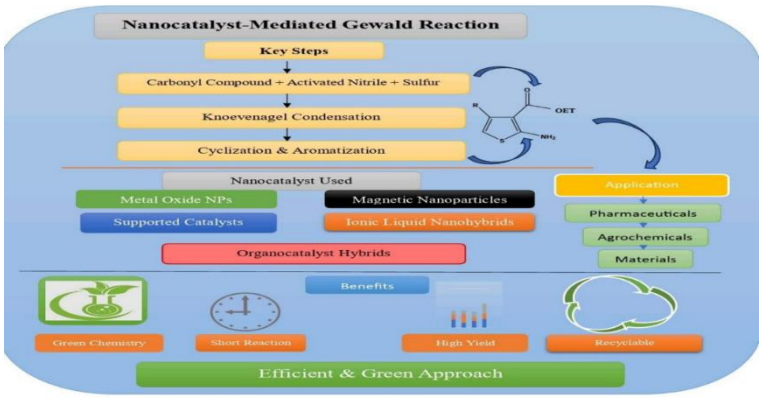
Nanocatalyst-Mediated Synthesis of 2-Aminothiophenes via Gewald Reaction: A Comprehensive Review

Sandip R. Rathod[a], Pankaj S. Chaudhari[b], Arun B. Patil[c*], Vijay A. Tarate[d]

[a,d] *Assistant Professor, Department of Chemistry, G. M. Vedak College of Science, Tala-Raigad, 402111*

[b] *Assistant Professor, Department of Chemistry, Shri V. R. College, Savana, Dist-Yavatmal (M.S),445216*

[c] *Professor, Department of Chemistry, P. N. College, Pusad, 445205*



Abstract: The synthesis of 2-aminothiophene derivatives has attracted significant attention due to their wide-ranging applications in pharmaceuticals, agrochemicals, and functional materials. The Gewald reaction, a multicomponent condensation involving carbonyl compounds, activated nitriles, and elemental sulfur, remains one of the most efficient routes for constructing this important heterocyclic scaffold. However, conventional methods often suffer from limitations such as prolonged reaction times, harsh conditions, and environmental concerns. In recent years, nanocatalyst-mediated approaches have emerged as a promising alternative, offering enhanced efficiency, selectivity, and sustainability.This review comprehensively summarizes recent advancements in the use of nanocatalysts for the Gewald reaction. Various classes of nanocatalysts, including metal oxide nanoparticles (ZnO, MgO, TiO_2, ZrO_2), magnetic nanoparticles (Fe_3O_4-based systems), supported nanomaterials, and organo-functionalized nanohybrids, have been discussed in detail. These nanocatalysts provide high surface area, tunable acid–base properties, and excellent recyclability, leading to improved reaction yields and reduced reaction times under mild conditions. Furthermore, their compatibility with green solvents and energy-efficient techniques such as microwave and ultrasound irradiation aligns with the principles of green chemistry.The review also highlights mechanistic insights, catalytic performance comparisons, and practical challenges such as catalyst stability and scalability. Overall, nanocatalyst-mediated Gewald reactions represent a sustainable and efficient strategy for the synthesis of 2-aminothiophenes, with significant potential for future industrial and pharmaceutical applications.

***Keywords**:* Gewald reaction, nanocatalyst, 2-aminothiophene, green synthesis, multicomponent reaction, metal oxide nanoparticles, magnetic nanoparticles, heterogeneous catalysis.

To prepare Bromo benzene to p-nitro bromobenzene

Yuvraj Kandanekar [1], Hitesh Mahadik [1], Surbhi R. Thakur*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract

The present study deals with the preparation of p-nitrobromobenzene from bromobenzene through an electrophilic aromatic substitution reaction known as nitration. Bromobenzene is an aromatic halide in which the bromine atom exhibits a dual electronic effect: it withdraws electrons through the inductive effect (–I) while donating electrons through resonance (+R). Due to its resonance effect, bromine directs incoming electrophiles to the ortho and para positions of the benzene ring. In this preparation, bromobenzene is treated with a nitrating mixture of concentrated nitric acid and concentrated sulfuric acid under controlled temperature conditions to favor para substitution. As a result, a mixture of ortho- and para-nitrobromobenzene is formed, with para-nitrobromobenzene being the major product due to lesser steric hindrance. The para isomer is separated by crystallization owing to its higher melting point compared to the ortho isomer. This experiment demonstrates the directing influence of substituents in aromatic compounds and highlights the importance of reaction conditions in controlling product formation. The prepared p-nitrobromobenzene is an important intermediate in the synthesis of dyes, pharmaceuticals, and other organic compounds.

Keywords: Bromobenzene , p-nitrobromobenzene, Nitration reaction, Electrophilic aromatic substitution, Nitro group.

Gas Sensors in Harsh Environments: Challenges and Recent Advances under High Temperature, Humidity, Radiation, and Corrosive Conditions

Tamseel Shakeel Shahjahan[1], Dr. Sajid F. Shaikh[1], Zhombarkar Umaymah[1]

1* Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Corresponding Author:

Zhombarkar Umaymah, Student**,** Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Abstract:

Gas sensing in extreme environments plays a vital role in maintaining safety standards and regulatory compliance across many industries. This is especially important in settings exposed to high temperatures, elevated humidity, radiation, and corrosive gases. In this review, we bring together recent research developments and key findings related to gas sensing technologies designed for such demanding conditions. Five major types of gas sensors—resistive, electrochemical, catalytic combustion, optical, and absorption-based sensors—are discussed in detail, with particular emphasis on how their performance is affected in harsh environments. We also examine how these challenging conditions influence sensor accuracy, stability, and lifespan, along with the latest strategies developed to overcome these limitations. In addition to the sensing elements, other critical components of sensor systems—such as electronics, wiring, and mounting structures—that are vulnerable to extreme environments are also considered. By highlighting recent advancements and emerging trends, this work offers a comprehensive perspective on improving the reliability and efficiency of gas sensors operating under harsh environmental conditions.

Keywords: Gas sensors; Harsh environments; High temperature; High humidity; Radiation effects; Corrosive gases; Sensor stability; Industrial safety; Advanced sensing technologies

Eco-friendly Treatment of Industrial Effluents Using Hybrid ETP Techniques

Mr. Shrinand Bhilare [*1], Dr. Namita More [1]

[1] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad,402-104.*

ABSTRACT: An Effluent Treatment Plant (ETP) is a system designed to treat industrial wastewater before it is released into the environment or reused. Industries generate wastewater containing harmful chemicals, suspended solids, oils, and toxic substances that can damage ecosystems and human health if discharged untreated. The main objective of an ETP is to remove contaminants and reduce pollutants to meet environmental discharge standards.The treatment process generally includes physical, chemical, and biological methods such as screening, coagulation, sedimentation, aeration, and filtration. These processes help in removing solid particles, reducing organic load, neutralizing harmful chemicals, and improving water quality. Proper operation of an ETP not only protects water bodies and soil from pollution but also promotes sustainable industrial development and water reuse.The chemical industry is a major contributor to global economic development, but it also generates significant quantities of process effluent, which can have harmful effects on the environment and human health if not properly managed. The proper handling of these by-products is therefore crucial in minimizing pollution, ensuring regulatory compliance, and promoting sustainable practices. This project focuses on the development and implementation of an integrated waste management system specifically tailored to the needs of the chemical industry. The primary objective of this project is to create an efficient, cost-effective, and environmentally sound approach to managing industrial process effluent and hazardous waste within chemical manufacturing plants. The project aims to address the key challenges faced by the industry in treating and disposing of waste, while adhering to stringent environmental regulations and improving operational sustainability. Effluent Treatment Technologies**:** A critical component of the project is the design and optimization of advanced effluent treatment technologies. This includes the use of chemical coagulation, adsorption, membrane filtration, and advanced oxidation processes (AOPs) to remove toxic substances such as heavy metals, organic solvents, and acids from industrial wastewater. The treatment system will be evaluated for its effectiveness in pollutant removal, operational costs, and energy efficiency, ensuring that the solution is both sustainable and scalable for a wide range of chemical processes. Safe Disposal and Recycling**:** For waste that cannot be eliminated or reduced, the project will explore methods for safe disposal and recycling. Waste-to-energy systems, secure landfilling techniques, and the recovery of valuable chemicals from waste streams will be evaluated. In addition, a sustainable approach to recycling hazardous materials, such as solvents and catalysts, will be developed to further reduce the environmental footprint of chemical operations.

Keywords: Industrial Water, Water pollution control, Effluent Monitoring, Recycle, ZLD.

Antibacterial, structural & morphological properties of metallic Nanoparticles synthesized by using modified Pechini sol-gel Method

Sandesh Khandagale[1*], Anita Kanwar[1], Devidas Gulwade[1], Niteshkumar Agrawal[2]

[1] *Department of Physics, Vivekanand Education Society's College of Arts, Science and Commerce, Mumbai-400071, Maharashtra, India*

[2] *Department of Electrical Engineering, Veermata Jijabai Technological Institute (VJTI), Mumbai-400019, Maharashtra, India*

Abstract: This report presents antibacterial activity of Ag/CuO/ZnO trimetallic nanoparticles (TMNPs) against S.aureus (Gram-positive), E.coli (Gram-negative) bacteria. The TMNPs were synthesized with modified Pechini Sol-gel method. In the above method citric acid and ethylene glycol were acted as fuel. The resulting TMNPs were analyzed by using X-ray diffraction (XRD), Dynamic light scattering (DLS), Zeta potential, SEM-EDX and Transmission electron microscopy (TEM). Antibacterial activity of TMNPs was accessed by agar cup diffusion method. Zeta potential & DLS technique indicates that prepared NPs are significantly stable and moderately poly-dispersed. In XRD method peaks of Ag, CuO and ZnO are seen. XRD method reveals synthesized NPs are pure with the size of crystallite ranging from 25 nm to 35 nm. SEM EDX validate presence of copper(Cu), silver(Ag), zinc(Zn) and oxygen (O) element in NPs sample. TEM images depict that NPs exhibit spherical morphology with size of TMNPs ranging from 20 to 32 nm. Agar cup diffusion method shows significant antibacterial activity against S.aureus (Gram-positive), E.coli (Gram-negative) bacteria. Our report confirms that simple, cost effective modified Pechini Sol-gel method is capable in production of superior quality Nanoparticles.

Keywords: S.aureus (Gram-positive), E.coli (Gram-negative), SEM EDX, TEM, XRD

Descriptor-Based Regression Models for Predicting Chemical Reaction Selectivity

Divya Chenna[1], Hetal Mehta*[1]

[1]*Department of Chemistry, SVKM's Mithibai College of Arts, Chauhan Institute of Science and Amrutben Jivanlal College of Commerce and Economics, (Empowered Autonomous)*

Bhaktivedanta Swami Marg, Gulmohar Road, Vile Parle (W), Mumbai, Maharashtra 400056

Abstract: Enantioselective catalysis is central to the synthesis of chiral molecules, particularly in the pharmaceutical and fine chemical industries. However, accurate prediction of enantioselectivity remains a significant challenge due to the complex interplay of steric and electronic effects. In this study, a data-driven machine learning approach is employed to model and predict enantioselectivity in a representative catalytic reaction system. The reaction space is encoded using a comprehensive set of molecular descriptors capturing steric, electronic, and topological features. Multiple regression algorithms, including Support Vector Regression, Random Forest, Gradient Boosting, and Extreme Gradient Boosting, are implemented and systematically evaluated using standard performance metrics such as R^2, RMSE, and MAE. The results demonstrate that ensemble-based methods outperform other models, delivering improved predictive accuracy and robustness. In particular, the best-performing model shows strong agreement between predicted and experimental values, indicating that the selected descriptor set effectively captures the underlying factors governing selectivity. These findings highlight the potential of descriptor-based machine learning frameworks for reliable prediction of reaction outcomes. Overall, this work underscores the utility of machine learning in advancing data-driven catalyst design and reaction optimization, offering a pathway to reduce experimental effort and accelerate the discovery of efficient and selective catalytic systems.

Keywords: Computational Chemistry, Data – Driven Catalysis, Reaction Optimization, Enantioselective Prediction, Asymmetric Catalysis.

Advancements in Smart Electrochemical Gas Sensors: Integrating IoT, Self-Powered Systems, and Machine Learning for Healthcare Applications

Tamseel Shakeel Shahjahan[1], Dr. Sajid F. Shaikh[1], Ulde Tamim[1]

1* Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Corresponding Author:

Ulde Tamim, Student**,** Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Abstract:

Electrochemical gas sensors have gained considerable attention because of their ability to detect gases with high sensitivity and selectivity. With recent progress in microelectronics, advanced materials, and computational tools, these sensors have evolved into smarter systems. Modern designs now support miniaturization, real-time data processing, and remote monitoring, making them more practical for everyday applications. The integration of technologies such as the Internet of Things (IoT), self-powered energy systems, and machine learning has further transformed these sensors into intelligent platforms. These innovations allow sensor systems to respond to changing environments in a way that closely mimics human adaptability, opening new possibilities in smart healthcare. This review discusses the fundamental sensing mechanisms, detection strategies, and recent developments in three major types of electrochemical gas sensors, along with their fabrication methods. It also highlights their applications in key areas such as environmental air monitoring, breath analysis for medical diagnostics, and microfluidic systems. Finally, the paper outlines current challenges and limitations, including issues related to stability, selectivity, and energy efficiency. It emphasizes the need for continued research to develop the next generation of highly reliable and efficient electrochemical gas sensors for advanced healthcare applications.

Keywords: Electrochemical gas sensors; IoT integration; self-powered systems; machine learning; smart healthcare; breath analysis; air quality monitoring; microfluidics; sensor miniaturization

A Study on the Estimation of Calcium in Pharmaceutical Tablets by Complexometric Analysis

Vaibhav S. Tambe [*1], Dr. Namita More[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: The estimation of calcium in pharmaceutical tablets is an important aspect of quality control to ensure accurate dosage, safety, and therapeutic effectiveness. Calcium is an essential mineral required for various physiological functions, including bone formation, muscle contraction, nerve transmission, and blood clotting. This study focuses on the quantitative determination of calcium in pharmaceutical tablets using complexometric titration with ethylenediaminetetraacetic acid (EDTA). Complexometric analysis is based on the formation of a stable complex between metal ions and a chelating agent. In this method, calcium ions react with EDTA in a 1:1 molar ratio to form a stable calcium-EDTA complex. The titration is carried out in an alkaline medium maintained at pH 10 using an ammonia buffer, which ensures effective complex formation. Eriochrome Black T is used as an indicator, which shows a colour change from wine red to blue at the endpoint, indicating the complete reaction between calcium ions and EDTA.The experimental procedure involves accurately weighing and powdering the tablet, dissolving it in dilute hydrochloric acid, and filtering the solution to remove insoluble impurities. The filtrate is diluted to a known volume, and a measured portion is titrated with a standard EDTA solution. The amount of calcium present in the sample is calculated based on the volume of EDTA used. This method is simple, precise, and cost-effective, making it suitable for routine laboratory analysis. However, interference from other metal ions may affect the accuracy if not properly controlled. Overall, complexometric titration is a reliable and efficient method for estimating calcium in pharmaceutical tablets and ensuring product quality.

Keywords: Calcium estimation, EDTA, pharmaceutical tablets, Eriochrome Black T indicator

Analysis and Application of Natural Dye Extracted from The Petals of Red Rose

Bhushan R. Deshmukh[*1], Naziya Jummal[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: This study focuses on the extraction, analysis, and application of natural dye obtained from the petals of red rose (*Rosa* species), emphasizing its potential as an eco-friendly alternative to synthetic dyes. Red rose petals are rich in anthocyanin pigments, which are responsible for their vibrant color and exhibit excellent solubility in water. The extraction process involves simple and cost-effective methods such as crushing the petals followed by heating in distilled water to obtain the dye solution. The chemical behavior of the extracted dye is significantly influenced by pH, showing a range of color variations from red in acidic conditions to bluish-green in alkaline environments, making it useful as a natural pH indicator. The dyeing performance was evaluated on different natural fabrics like cotton, silk, and wool using various mordants such as alum, iron, and copper salts to improve color fixation and fastness. The results indicate that mordanting enhances the depth and durability of the color, although the overall fastness properties remain lower compared to synthetic dyes. Despite these limitations, the dye demonstrates several advantages including biodegradability, non-toxicity, and minimal environmental impact. The study also highlights its potential applications in textile dyeing, eco-friendly crafts, cosmetics, and educational purposes. However, challenges such as limited color stability, sensitivity to environmental factors, and seasonal availability of raw materials need to be addressed for large-scale utilization. Overall, the research supports the growing interest in sustainable and green technologies by promoting the use of plant-based dyes, and suggests further improvements through advanced techniques to enhance the performance and commercial viability of natural dyes extracted from red rose petals.

Keywords: Natural dye, Red rose petals, *Rosa* species, Anthocyanins, Dye extraction, Mordanting, Textile dyeing, Eco-friendly, pH indicator, Color fastness, Sustainable materials, Biodegradable pigments

Preparation of V_2O_5 nanocrystallites using Vanadium oxalato Complex and its use in degradation of Malachite green dye

Ajay V. Gole [1] , and Vijay P. Jadhav [2]
[1] Department of Chemistry, SVKM's Mithibai College of Arts Chauhan Institute of Science And Amrutben Jivanlal College of Commerce And Economics, Vile Parle (W), Mumbai-400056
[2] Department of Chemistry Thakur College of Science ;Commerce,ThakurVillage,Kandivali (E),Mumbai - 400 101
ajay.gole76@gmail.com

Abstract: The chemical path provides us new materials which are having specific size, shape, morphology and stoichiometry which have very interesting applications. V_2O_5 is used as catalyst for various industrial applications, in making LASER Crystals, electrode in development of super capacitors, also it is used for various photocatalytic reactions. Malachite green dye is an organic compound having IUPAC name 4-{4-(dimethylamino) phenylmethylidene}-N,N-dimethylcyclohexa-2,5-dien-1-iminium chloride. Malachite green is a synthetic triphenylmethane dye originally employed as an industrial colorant in textile, paper, and leather industries. However, substantial evidence has revealed its high toxicity, including carcinogenic, teratogenic, and mutagenic effects, posing severe threats to both ecological systems and human health, leading to strict regulations or outright bans in numerous countries is produced as water pollutant in textile, plastic and dye industries. If directly discharged into water, they can cause serious damage to the environment due to their deep colour and low degradation rate. Herein, we demonstrate one convenient monitoring method to prepare V_2O_5 nanocrystallites using oxalic acid metal in 1:2 ratio. The complex was characterised by Uv-Vis, FTIR. The complex was used as single source precursor for preparation of V_2O_5 nanocrystallites. 0.300 g of complex was taken for open air pyrolysis in horizontal furnace at 500 ^oC and it was annealed for two hours and furnace was allowed to cool at room temperature. The orange colour powder was characterized by powder XRD,SAED and TEM. The prepared nanoparticles showed very excellent result in degradation of Malachite green dye up to 10 photo catalytic cycles with in few seconds

Key words: - Vanadium pentaoxide, Malachite green dye, photo degradation

A Comprehensive Review of Surface Acoustic Wave (SAW) Gas Sensors: Principles, Design, and Applications

Dr. Sajid F. Shaikh[1] , Tamseel Shakeel Shahjahan[1], , Suraj Gorivale[1]

1* Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Corresponding Author:

Suraj Gorivale, Student**,** Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Abstract:

Surface acoustic wave (SAW)-based gas sensors have gained growing interest as a promising sensing technology because of their advanced micro- and nanoscale structures and their ability to integrate multiple physical interactions. These sensors offer several advantages, including high sensitivity, fast response times, a broad detection range, and compact, lightweight design. This review provides a detailed overview of the fundamental sensing principles and mechanisms of SAW gas sensors, along with their design and fabrication approaches. It also discusses the associated signal acquisition and processing systems. Furthermore, the paper highlights their potential applications in areas such as renewable energy, aerospace, defense, industrial automation, and smart manufacturing. Finally, future perspectives and emerging trends in the development of SAW-based gas sensing technologies are outlined.

Keywords

Surface acoustic wave sensors; gas sensing; micro/nano structures; sensing mechanisms; signal processing; smart manufacturing; industrial applications; sensor design

Green synthesis and characterization iron nanoparticles using plant extracts

Sumit Magar[1], Shubham magar[1], Surbhi R. Thakur*[1]

[1] *Chemical Research Lab. Department of Chemistry, G. M. Vedak College of Science, Tala 402 111, University of Mumbai, Maharashtra, India.*

Abstract:

Abstract Development of green nanotechnology is generating interest of researchers toward ecofriendly biosynthesis of nanoparticles. In this study, bison- thesis of stable silver nanoparticles was done using Tulsi (*Ocimum sanctum*) leaf extract. These bison- the sized nanoparticles were characterized with the help of UV–vis spectrophotometer, Atomic Absorb- Tion Spectroscopy (AAS), Dynamic light scattering (DLS), X-ray diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), and Transmission electron microscopy (TEM). Stability of bio reduced silver nanoparticles was analysed using UV–vis absorption spectra, and their antimicrobial activity was screened against both gram-negative and gram- positive microorganisms. It was observed that *O. sanctum* leaf extract can reduce silver ions into silver nanoparticles within 8 min of reaction time. Thus, this method can be used for rapid and ecofriendly biosynthesis of stable silver nanoparticles of size range 4–30 nm possessing antimicrobial activity suggesting their possible application in medical industry.

Keywords: Herbal, Tea tulsi , Kadha Ayurvedic, medicine Home, remedy Herbal ,supplement.

Improving HPLC Analysis of Natural Triterpenoids through Chemical Derivatization Techniques

Dr. Sajid F. Shaikh[1] , Tamseel Shakeel Shahjahan[1], , Swaliha Karbari [1]

1* Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Corresponding Author:

Swaliha Karbari, Student**,** Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Abstract:

Triterpenoids are naturally occurring compounds known for their diverse pharmacological properties and are widely found in plants. Accurately measuring these compounds in different sample types, particularly biological samples, is highly important for research and applications. High-performance liquid chromatography (HPLC) is commonly used for their analysis due to its strong analytical capabilities. However, separating individual triterpenoids remains difficult because of their similar chemical structures. Another major challenge is that triterpenoids lack strong ultraviolet (UV) absorbing groups and chromophores, and they also show low ionization efficiency in mass spectrometry. As a result, conventional HPLC methods often suffer from low sensitivity. To overcome these limitations, chemical derivatization has become an essential approach to enhance detection and overall analytical performance. Various derivatization reagents—such as acid chlorides, rhodamines, isocyanates, sulfonic esters, and amines—have been used to improve the analysis of triterpenoids based on their structural features. This review summarizes recent advancements in derivatization strategies for HPLC-based detection of triterpenoids. It also discusses the existing limitations and challenges, and highlights future directions for developing more efficient and sensitive derivatization methods.

Keywords:

Triterpenoids; HPLC analysis; chemical derivatization; analytical sensitivity; quantification

Phytopigments as Natural Food Colorants: A Comparative Study with Synthetic Additives

Neha Turai*[1], Dr. Sandesh Gavade*[1], Yash Jangam[1], Vaishnav Bagve[1], Piyush Bhonkar[1], Dr. Namita More*[1]

[1] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon – Raigad, 402-104.*

Graphical Abstract: Natural Colour Sources

Abstract: Food coloring is the addition of chemicals to food and drink to improve their look and make them more appealing. Food coloring has become widely used in the food business because it enhances food's visual attractiveness and affects consumers preferences and appetites. Natural and artificial food colors are the two main categories into which food colors can be divided. Fruits, vegetables, plants, and minerals are examples of natural food coloring sources. Carrots, spinach, turmeric, and beetroot are a few examples. Conversely, artificial food colors are made chemically and are frequently found in processed meals like ice cream, cakes, soft drinks, and candy. Food coloring is the addition of chemicals to food and drink to improve their look and make them more appealing. Food coloring has become widely used in the food business because it enhances food's visual attractiveness and affects consumers' preferences and appetites. Natural and artificial food colors are the two main categories into which food colors can be divided. Fruits, vegetables, plants, and minerals are examples of natural food coloring sources. Carrots, spinach, turmeric, and beetroot are a few examples. Conversely, artificial food colors are made chemically and are frequently found in processed meals like ice cream, cakes, soft drinks, and candy.

Keywords: Food coloring, Natural , Artificial, Carrots, Spinach, Turmeric, Beetroot

Band Gap Engineered ZnO/g-C_3N_4 Z-Scheme Heterojunction for Enhanced Visible-Light Photocatalytic Degradation and Hydrogen Evolution: A Semiconductor Physics Perspective

1. Miss. Vishakha G. Mankame

Department of Physics, Sheth. J. N Paliwala College, Pali- Sudhagad-Raigad, M.S

2. Mrs Asmita M. Patil

Department of Chemistry, Sheth. J. N Paliwala College, Pali- Sudhagad-Raigad, M.S

ABSTRACT

The increasing demand for sustainable environmental remediation and clean energy has intensified research in semiconductor photocatalysis. This study highlights band gap engineering as an effective strategy to enhance visible-light-driven photocatalytic activity. A ZnO/g-C_3N_4 heterojunction nanocomposite is proposed as a cost-effective and eco-friendly photocatalyst with favourable band alignment. The integration of ZnO with g-C_3N_4 improves light absorption, promotes interfacial charge transfer, and suppresses electron–hole recombination. Structural, optical, and morphological properties were analyzed using XRD, UV–Vis DRS, FTIR, SEM, and PL techniques, confirming successful heterojunction formation and improved photophysical characteristics. The composite exhibits enhanced generation of reactive oxygen species, leading to efficient degradation of organic dyes, while its optimized conduction band supports hydrogen evolution. A Z-scheme charge transfer mechanism is proposed to explain the improved photocatalytic performance, demonstrating the potential of ZnO/g-C_3N_4 as an efficient material for environmental and energy applications.

KEYWORDS: Band gap engineering, ZnO/g-C_3N_4, photocatalysis, hydrogen evolution, heterojunction, green energy.

Green Analytical Approach for Trace Determination of Chromium in Water Samples.

[1]Himani Sanjay More

[1]SONOPANT DANDEKAR ARTS, V.S. APTE COMMERCE AND M.H. MEHTA SCIENCE COLLEGE, KHAREKURAN ROAD PALGHAR

Abstract:

A green, simple, and efficient vortex-assisted dispersive liquid–liquid microextraction (VA-DLLME) method using a natural deep eutectic solvent (NADES) was developed for the preconcentration and determination of trace levels of chromium in water samples, followed by UV–visible spectrophotometric detection. The use of NADES as an extraction solvent offers significant advantages due to its low toxicity, biodegradability, and eco-friendly nature. . The effective parameters of the applied method effect of pH , percentage and volume of complexing agent, volume of NADES, vortex time, Salt effect were optimized. Under optimized conditions, the method exhibited good linearity over a wide concentration range with a low limit of detection and satisfactory precision. The proposed VA-DLLME–UV–Vis method demonstrated high enrichment factor and good recovery values for chromium in different water samples. The results confirm that the developed method is a reliable, cost-effective, and environmentally benign approach for routine monitoring of vanadium in environmental water samples.

Extraction of phytochemicals from tagetes (marigold) it's characterization by HPLC and FTIR and it's applications

Rushikesh R. Dhamanse[*1], Miss. Naziya Jummal [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: This study will focus on the extraction and characterization of bioactive phytochemicals from Tagetes (marigold) to evaluate their therapeutic potential. Following solvent extraction, High-Performance Liquid Chromatography (HPLC) will be employed to quantify key metabolites like lutein and flavonoids, while Fourier-Transform Infrared Spectroscopy (FTIR) will be used to identify specific functional groups and structural properties.The project will subsequently investigate the extract's antioxidant and antimicrobial applications, assessing its suitability as a natural colorant, food preservative, or pharmaceutical additive. By bridging extraction efficiency with rigorous analytical profiling, this research will highlight the industrial value of marigold as a sustainable source of high-purity natural compounds.

Keywords: Tagetes, Phytochemicals, HPLC, FTIR, Antioxidant, Lutein, Bioactive Compounds.

ISOLATION OF KERATINOLYTIC ORGANISMS FROM POULTRY WASTE AND THEIR APPLICATION FOR SILVER EXTRACTION FROM USED X-RAY FILMS

Tidar Nilima.P[1], Gandhar Archana.P[2], Padwal Raj S[3], Sayyed Ummehani S[4], [1,2,3,4]C. K Thakur ACS College New Panvel (Empowered Autonomous) Sector-11, Khanda Colony, New Panvel (W), Dist.-Raigad, Maharashtra, India, Pincode-410206. nilima.tidar@gmail.com

Abstract

Poultry waste represents one of the largest reservoirs of keratin-rich materials such as feathers, which are highly resistant to degradation and contribute significantly to environmental pollution. At the same time, discarded X-ray films pose additional environmental concerns due to their gelatine layer containing silver halides, and conventional chemical methods for silver extraction are hazardous and inefficient. This study was designed to address both waste streams through a microbial and enzymatic approach. Soil and feather samples collected from various poultry sites yielded approximately 30 bacterial isolates, of which a few demonstrated significant proteolytic and keratinolytic activity on skim milk agar and feather meal agar. These selected isolates were further cultivated for keratinase production. The crude enzyme was partially purified using ammonium sulphate precipitation followed by dialysis. Enzyme characterization revealed optimum keratinase activity at pH 8 and 45°C, supporting its alkaline protease nature. The produced keratinase efficiently degraded feathers and was further applied for the biodegradation of the gelatine layer of used X-ray films, enabling the release of silver halide in an eco-friendly manner. Overall, the study demonstrates an effective strategy for poultry waste valorisation and sustainable silver recovery, converting two problematic wastes into valuable resources.

Keywords: Poultry waste, keratinase, keratinolytic organisms, feather degradation, x-rays, silver halide, enzyme optimization, gelatine layer, silver recovery.

Comprehensive review on chromatographic analysis of flavonoids in fruits

Dr. Sajid F. Shaikh[1] , Tamseel Shakeel Shahjahan[1], , Sarthak Chorghe[1]

1* Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Corresponding Author:

Sarthak Chorghe , Student**,** Anjuman Islam Janjira Degree College of Science, Murud – Janjira, 402401

Abstract: Flavonoids are natural compounds that are abundant in fruits and have many benefits for human health. Their antioxidant, anti-inflammatory, and anticancer effects make these compounds important for health. Chromatographic analytical methods are the most commonly used methods for detecting, separating, and quantifying flavonoids in fruit species. Methods such as high-performance liquid chromatography (HPLC), gas chromatography (GC), thin-layer chromatography (TLC), and liquid chromatography-tandem mass spectrometry (LC-MS) are crucial for the analysis of flavonoids. In recent years, hybrid systems combining MS and ultraviolet (UV) detectors have been developed to increase the sensitivity of these techniques. HPLC-MS techniques are one of the most preferred methods for determining flavonoids. Flavonoid profiles between different fruit species have been compared using this technique. Although the GC method is less widely used, it uses derivatization steps to analyze non-volatile flavonoids. The accuracy and sensitivity of GC may be limited compared to other methods. TLC, a simpler and more economical method, is still preferred for separating flavonoids. However, it is less widely used than HPLC due to its limited quantitative analysis capacity. Recently, there have been technological developments in chromatographic methods of analysis. Ultra-high-performance liquid chromatography (UHPLC) offers shorter analysis times and higher resolution, especially for separating complex flavonoid mixtures. In this review, the analysis of flavonoids using chromatographic methods and a detailed discussion of studies in the literature to determine flavonoids in fruits are discussed.

Keywords:

Flavonoids Fruit samples Analytical methods Chromatography Phenolic compounds

SYNTHESIS OF 7-HYDROXY-4-METHYL COUMARIN (UMBELLIFERONE) BY PECHMANN REACTION AND ITS STUDY

Kanchan J Belose*[1], Vishakha V Pawar[1]
D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

ABSTRACT- 7-Hydroxy-4-methyl coumarin is a significant derivative of the coumarin family, a class of heterocyclic compounds known for their diverse biological and chemical properties. Coumarin derivatives occur naturally in many plants and have gained considerable attention due to their wide range of applications in pharmaceuticals, analytical chemistry, and material science. Among these, 7-hydroxy-4-methyl coumarin stands out because of its stability, ease of synthesis, and versatile functional properties. The synthesis of 7-hydroxy-4-methyl coumarin is commonly carried out by the Pechmann condensation reaction, which involves the condensation of resorcinol with ethyl acetoacetate in the presence of a strong acid catalyst such as concentrated sulfuric acid. This method is widely preferred due to its simplicity, high yield, and cost-effectiveness. The reaction proceeds through esterification, cyclization, and dehydration steps, resulting in the formation of the coumarin ring system. The synthesized compound is usually purified by recrystallization and characterized using techniques such as melting point determination, UV-visible spectroscopy, and infrared spectroscopy. 7-Hydroxy-4-methyl coumarin exhibits a variety of important biological activities. It has been reported to possess antimicrobial properties against several bacterial and fungal strains

Keywords- coumarin derivatives, 7- Hydroxy - 4 Methyalcoumarin, Benzopyrone structure, Aromatic compound, Finolic Group, Pechmann Condensation, Ethyal acetoacetate ,Acid Catalyst (H_2SO_4)

Formulation and Evaluation of Ayurvedic Herbal Soap Using Natural Plant Extract

Urmila Khobragade*, Saniya Jadhav[1], Shrushti Tetgure[1], Prachi Sadhu[1], Dr. Namita More*[1]

[1] *D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon – Raigad, 402-104.*

Graphical Abstract: Ayurvedic Herbal Soap

Abstract: A common cleaning solution, soap is essential for preserving personal hygiene and stopping the spread of illness. It is created via a chemical process known as saponification, in which fats or oils combine with an alkali like potassium or sodium hydroxide. Because soap molecules have certain chemical characteristics that enable them to bond with both water and oil, dirt, grease, and bacteria can be effectively removed from surfaces. Soap comes in a variety of forms, including bars, liquids, and powders. To improve its qualities, it may also include other substances including colorants, scents, and moisturizers. Soap continues to be one of the most important goods for sanitation and public health globally because of its efficacy, cost, and accessibility.

Keywords: Soap, Colorants, Scents, Moisturizers, Public Health Globally, Sanitation

Indole Derivatives: Synthesis, Functionalization, and Applications in Medicinal Chemistry

Nitin S. Pawar, Jayesh T. Monde
Anjuman Islam Janjira Degree College of Science Murud-Janjira, Raigad, Mahaharshtara-402401

Abstract

Indole derivatives constitute an important class of heterocyclic compounds widely recognized for their significant role in medicinal chemistry, organic synthesis, and material science. The indole nucleus, a bicyclic structure consisting of a benzene ring fused with a pyrrole ring, serves as a versatile scaffold for the development of biologically active molecules. Numerous naturally occurring and synthetic indole derivatives exhibit diverse pharmacological properties such as antimicrobial, anticancer, anti-inflammatory, antiviral, and antioxidant activities. In recent years, extensive research has focused on the synthesis and functionalization of indole derivatives using efficient and eco-friendly methodologies, including green chemistry approaches and catalytic processes. Various substitution reactions at different positions of the indole ring have enabled the design of compounds with enhanced biological activity and selectivity. Furthermore, indole-based compounds play a crucial role in drug discovery, with several clinically important drugs containing the indole moiety. This work highlights the synthesis strategies, reactivity, and broad-spectrum applications of indole derivatives, emphasizing their importance in the development of novel therapeutic agents and advanced functional materials. The study underscores the potential of indole chemistry in addressing current challenges in pharmaceutical and chemical research.

Keywords

Heterocyclic compounds, Medicinal chemistry, Green synthesis, Pharmacological activity, Anticancer activity, Antimicrobial activity, Organic synthesis

Heavy Metal Contamination In Urban vs Rural Soils

Deep P. Monde[*1], Dr. Namita More [1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Konkan, Maharashtra is different from other parts of Maharashtra and also from India in terms of variation in geology, climate, soils, and environment. Konkan covers an area of nearly 30 lakh hectares and represents a coast line of 720 km stretching south of Gujarat to north of Goa. This basaltic terrain receives a rainfall averaging 2500-4000 mm. The part of northern part of Konkan comprising of part of Raigad, Thane and Palghar, bear some similarity of typical basaltic landscape like central Maharashtra and Vidarbha. This might be due to the fact that Palghar and Thane are on lower elevation and has more breadth (distance between Arabian sea and the Western Ghats) resulting in the formation and persistence of deep black soils as is common in other parts of Maharashtra. Konkan gradually narrows down south to Goa and represent undulating landscape with steep slopes causing severe soil erosion. This happens in spite of the fact that south Konkan has more vegetation. This is the reason why south Konkan is represented by relatively shallow red soils and at places these soils are deep to be qualified as alisos. Formation of these soils and their persistence has been detailed in this article. Information on different soil orders and other variations of soils are also discussed. As compared to the soils of the Indo-Gangetic plains and black soil region, Konkan soils show a decreasing trend of potassium reserve with increase

Keywords: Konkan, climate change, carbon sequestration, soils, potassium, carbon, micro nutrients.

Green Nanotechnology: Synthesis and Applications of Metal Nanoparticles in Modern Science

Nitin S. Pawar, Gaykar Vidyadhar Vasant

Anjuman Islam Janjira Degree College of Science Murud-Janjira, Raigad, Mahaharshtara-402401

Abstract

Green nanotechnology has emerged as a sustainable and environmentally friendly approach for the synthesis of metal nanoparticles, offering significant advantages over conventional physical and chemical methods. This approach utilizes biological resources such as plant extracts, microorganisms, and natural biomolecules as reducing and stabilizing agents, minimizing the use of toxic chemicals and energy consumption. Metal nanoparticles, including silver, gold, and zinc oxide nanoparticles, exhibit unique physicochemical properties such as high surface area, enhanced reactivity, and remarkable optical behavior. These properties make them highly suitable for a wide range of applications in fields such as medicine, environmental remediation, agriculture, and material science. In particular, biologically synthesized nanoparticles have demonstrated promising antimicrobial, anticancer, antioxidant, and catalytic activities. Recent advancements have focused on optimizing synthesis conditions, improving particle stability, and enhancing functional performance for targeted applications. Despite significant progress, challenges such as large-scale production, reproducibility, and long-term environmental impact remain critical concerns. This study highlights recent developments in green synthesis methods, characterization techniques, and diverse applications of metal nanoparticles, emphasizing their potential in advancing sustainable technologies and addressing global environmental and health challenges.

Keywords

Green nanotechnology, Metal nanoparticles, Biological synthesis, Antimicrobial activity, Environmental remediation, Sustainable chemistry

Development of a Polyherbal Shampoo Based on Traditional Medicinal Plants

Tahsin Rawoot*[1], Fariha Zaheer[1], Masira Dhansay[1],Simra Rawoot[1], Dr. Namita More*[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon – Raigad, 402-104.*

Graphical Abstract: Polyherbal Shampoo from Nature

Abstract: Artificial compounds used in commercially available synthetic shampoos have the potential to injure hair follicles, the epidermis, and the scalp, among other adverse effects. Customers now favor herbal products over synthetic ones since they have less side effects and are therefore safer. This is because consumers are more conscious of the negative effects that synthetic products can have on their skin, hair, and eyes. Herbal shampoo is a type of cosmetic preparation that uses herbs to remove excess oil and dandruff from the hair and scalp. The current study's primary goal is to create and assess a polyherb shampoo using natural ingredients. Aloe vera (Aloe barbadensis), Shikakai fruit (Acacia concinna), Hibiscus flower (Hibirosea), Neem leaf (Azadirachta indica), and soap are among the botanicals used in the preparation. Hibiscus flower (Hibirosea), Neem leaf (Azadirachta indica), Shikakai fruit (Acacia concinna), Aloe vera (Aloe barbadensis), Soap n (soap berries), Amla (Emblica officinalis), Black sesame seeds (Sesamum indicum L.), Reetha (Sapind mukorossi), and Fenugreek powder (Trigonella foenum-graecum) are among the herbs used in the preparation. Physical appearance, pH, wetting time, viscosity, surface tension, foam stability, soil dispersion, percent solid content, antibacterial activity, skin irritation, and general stability were all assessed for the formulations. Only little variations in the prepared shampoo's assessment characteristics were found during a stability study that lasted one to two months.

Keywords: Herbal shampoo, natural ingredients, green chemistry, organic synthesis, sustainability

Role of Ancient Indian Medicinal Chemistry in Modern Era: A Review

Pravin Meshram[1], Mayur Pardhi[1], Pratima Bamgude[1], Shrikrishna Tupare*[2]

[1] Department of Chemistry, Dr. Babasaheb Ambedkar College Mahad, Raigad, 402301, Maharashtra, India.

[2] Department of Chemistry, K.E.S. Anandibai Pradhan Science College, Nagothane, Raigad, 402106, Maharashtra, India

Corresponding Author Email: shritupare@yahoo.com

ABSTRACT

Medicinal chemistry is the multidisciplinary discipline that uses chemistry to design, synthesize, and optimize molecules for drug development. In the literature written evidences of Indian medicinal chemistry are mainly obtained from Ayurveda. In Ayurveda Charaka Samhitas and Sushrut Samhitas were the oldest sources of medicinal knowledge which provide therapeutic explanation of different material used for different diseases. Approx in 900 B.C. Charaka Samhitas mentioned 341 medicinal plant which are used for medicinal purposes. While in 600 B.C. Sushrut Samhitas mentioned 395 medicinal plants. It gives information about healthy life, precautionary measures for illness, treatment for specific diseases, eradication of germs, antidotes to poison, genetic diseases etc. Not only simple diseases but hypertension, insomnia, insanity, cardiovascular drugs, brain tonics, or rejuvenators are also mentioned in Indian ayurveda. It is necessary to explore the traditional knowledge with modern science in the synthesis of novel drug. In old days different plant extracts are used to recover from various diseases. These plants extracts contain different chemical now a days they are termed as active ingredient of drugs. It is necessary to study these plants as a source of a new drug in the synthesis of medicinal chemistry. This review gives information about Indian traditional medicine compare with synthesis of drug used in traditional and modern era. This review aims to summarize recent synthetic strategies for drug with the help of tradition Indian medicinal knowledge,

***Keywords*:** IKS, Medicinal plants, Active chemical ingredient, Drugs, Plants extract

Redefining Organic Synthesis through Green Chemistry and Sustainable Catalysis

Mr. Khan Shoyeab Mutalib, Ms. Khan Sana Yusuf , Mr. Mahadik Rutvik Rohidas

Department of Chemistry, Anjuman Islam Janjira Degree College of Science, Murud Janjira.

Abstract

The increasing global emphasis on sustainable development has positioned green chemistry as a key approach for designing environmentally responsible chemical processes. This review highlights recent progress in green methodologies for organic synthesis aimed at reducing the use of hazardous reagents and toxic solvents while improving reaction efficiency and atom economy. Environmentally benign strategies such as solvent-free reactions, the use of water and other eco-friendly solvents, plant-derived biocatalysts, and microwave-assisted synthesis have emerged as effective alternatives to conventional synthetic techniques. Significant developments in metal-free catalytic systems demonstrate a gradual shift away from traditional transition-metal-based processes toward safer and more sustainable approaches. In addition, the use of natural catalysts, bio-based solvents, and microbial biotransformations illustrates the expanding scope of green chemistry in modern organic synthesis. Advanced techniques including photocatalysis and phase-transfer catalysis further enhance reaction selectivity, energy efficiency, and overall sustainability. Collectively, these green methodologies enable higher yields, shorter reaction times, and reduced environmental impact. This review emphasizes the growing importance of green chemistry in promoting sustainable organic synthesis and its potential applications in pharmaceutical and fine chemical industries..

Keywords: Green chemistry; Sustainable organic synthesis; Biocatalysis; Green solvents; Microwave-assisted synthesis; Metal-free reactions; Photocatalysis; Atom economy.

A Comparative Study on Estimation of Total Phenolic Content and Antioxidant Activity of Selected Medicinal Plants

Shubham V. Pawar[*1], Asst. Prof. Mehreen M. Dawre[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.

Abstract: Medicinal plants are a rich source of bioactive compounds, particularly phenolic constituents, which play a crucial role in combating oxidative stress through their antioxidant properties. The present study focuses on a comparative evaluation of total phenolic content (TPC) and antioxidant activity in selected medicinal plants widely used in traditional medicine. Plant extracts were prepared using suitable solvents, and the TPC was quantified using the Folin–Ciocalteu method, expressed as gallic acid equivalents (GAE). Antioxidant activity was assessed through standard in vitro assays such as DPPH free radical scavenging, ABTS assay, and reducing power capacity. The results revealed significant variations in phenolic content and antioxidant potential among the studied plant species, indicating that phytochemical composition is strongly influenced by plant type and extraction method. Plants exhibiting higher phenolic content demonstrated stronger free radical scavenging activity, suggesting a positive correlation between phenolic compounds and antioxidant efficiency. Statistical analysis further supported the relationship between TPC and antioxidant assays, confirming the role of phenolics as primary contributors to antioxidant activity. This comparative study highlights the importance of medicinal plants as natural antioxidants and supports their potential application in pharmaceutical and nutraceutical formulations. The findings also provide a scientific basis for the traditional use of these plants in managing oxidative stress-related disorders. Further studies focusing on isolation and characterization of specific phenolic compounds may enhance the development of plant-based therapeutic agents.

Keywords: Medicinal plants, Total phenolic content (TPC), Antioxidant activity, Folin–Ciocalteu method, DPPH assay, Free radical scavenging, Phytochemicals, Oxidative stress**.**

A Comprehensive Review of Nutritional Degradation and Chemical Changes in Dough and Fresh-Cut Vegetables During Overnight Storage

Divyani S. Malusare*[1], Asst. Prof. Mehreen M. Dawre[1]

[1]D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon – Raigad, 402104

Abstract: In modern lifestyles, the practice of preparing food in advance, such as storing kneaded dough and refrigerating cut vegetables, has become increasingly common due to its convenience. However, growing scientific evidence suggests that such storage practices can influence the nutritional and chemical composition of food. This review examines the impact of overnight storage on prepared food items, with particular emphasis on wheat dough and commonly used vegetables. Previous studies indicate that storage under refrigeration, although effective in slowing microbial growth, does not completely inhibit biochemical and enzymatic reactions. Parameters such as pH, moisture content, texture, and color are often altered during storage. In addition, nutrient degradation—especially the loss of heat- and oxygen-sensitive vitamins like Vitamin C—has been widely reported. Oxidative processes and enzymatic browning further contribute to quality deterioration in cut vegetables, while stored dough may undergo slight fermentation and structural changes. The review highlights that while overnight storage may result in only moderate changes, these can cumulatively affect food freshness, safety, and nutritional value. It underscores the importance of adopting proper storage practices, including controlled temperature and minimal exposure to air. Overall, this study emphasizes the need to balance convenience with nutritional quality and provides insight into food preservation within the domain of food chemistry.

Keywords: Food Storage; Nutritional Changes; Refrigeration; Dough Storage; Cut Vegetables; Vitamin Loss; Microbial Growth; Food Quality; Food Chemistry

Mini Review: One pot synthesis of benzimidazoles derivatives.

Dr. Swati S. Ghodke*[1]

[1]*Department of Chemistry, Deogiri College, Chh. Sambhajinagar (Aurangabad) (MS) - 431 005 India.*

Abstract: Benzimidazole could be a heterocyclic aromatic chemical composite. It's a crucial pharmacophore and privileged structure in medicative chemistry. It plays a dreadfully vital role with lots of helpful beneficial activities such as antifungals, antiulcers, medication, antihypertensives, anticancers, and antihistaminics, analgesic, antivirals etc. This is because it work for a very important purpose. The literature review reveals that benzimidazoles derivatives are effective chemicals and a wide range of reviews that are presently available on the market for organic chemistry and medical individual studies have confirmed that the molecules of these compounds are helpful against a variety of different microorganisms. Benzimidazole derivative play important role in the chemical industry, medicinal field. It contains fused heterocyclic core ring structure that exhibits various biological activities. Due to its huge importance this review aims at compiling the various substituted benzimidazoles and some other methods focusing on both conventional as well as nonconventional methods. The rise of microwave-assisted synthesis, green chemistry methodologies, and solid phase strategies for chemical manufacturing are explored. Benzimidazole is a heterocyclic compound that contains two nitrogen atoms and is formed by fusing a benzene ring with an imidazole. Benzimidazole and its derivatives are prepared in a range of ways, including condensation of o-phenylenediamine with carbonyl compounds.

Keywords: Benzimidazole, o-phenylenediamine and aromatic substituted aldehyde, Biological activities, green chemistry, solvent, etc.

Structural Modification of a Known Drug Molecule for Enhanced Biological Activity

Raju B. Rajbhar[1], Urmila Khobragade[*1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Abstract: Structural modification of known drug molecules is a well-established and efficient strategy for enhancing biological activity and improving pharmacological properties. From an organic chemistry perspective, even minor changes in molecular structure—such as the substitution of functional groups, modification of side chains, or incorporation of heterocyclic moieties—can significantly influence the interaction of a drug with its biological target. Such modifications may improve receptor binding, metabolic stability, solubility, and overall therapeutic efficacy. Using known drugs as lead compounds offers several advantages over the development of entirely new chemical entities. Since the pharmacological behavior and safety profiles of known drugs are already documented, structural modification allows for rational optimization while minimizing risks associated with toxicity and failure. This approach is both cost-effective and time-efficient, making it particularly suitable for academic research at the postgraduate level. Advancements in computational modeling, molecular docking, and cheminformatics have further strengthened the role of structural modification in modern drug design. These tools allow researchers to predict the effects of molecular changes on biological activity and optimize drug candidates more efficiently. Combined with experimental techniques, such as in vitro and in vivo biological evaluation, structural modification serves as a powerful and systematic approach to developing improved therapeutic agents. The significance of this study lies in its contribution to scientific knowledge, skill development, and potential therapeutic advancement. It reinforces the importance of organic chemistry in addressing ongoing challenges in drug development and supports the continued exploration of structurally modified drug molecules for enhanced biological activity.

Keywords: Drug, Compound library, Virtual Screening, Target Structure, Hit Molecule, Lead Molecule, Synthesis, Solubility, Lipophilicity, Pka, etc.

Preparation and Evaluation of an Ayurvedic Clove Scented Candle

Ankita mhaske*[1], Mahek Kardekar[1], Ruheena Chimavkar[1], Safwan Salkar[1], Dr. Namita More*[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*

Graphical Abstract: *Ayurvedic Clove Scented Candle*

Abstract: The creation and assessment of an Ayurvedic clove-scented candle utilizing natural and herbal ingredients is the main goal of this research. Syzygium aromaticum, the technical name for clove, is well known in Ayurveda for its antibacterial, antifungal, and medicinal qualities. To provide a safe and environmentally sustainable product, the candle was made with natural wax (such as beeswax or soy wax), cotton wick, clove essential oil, and appropriate herbal additions. In order to maintain fragrance stability, the wax was melted at a regulated temperature, a calibrated amount of clove essential oil was added, and the mixture was then poured into molds with wicks positioned correctly. The candles were assessed for appearance, burning time, aroma preservation, uniformity of burning, and smoke output after solidification.

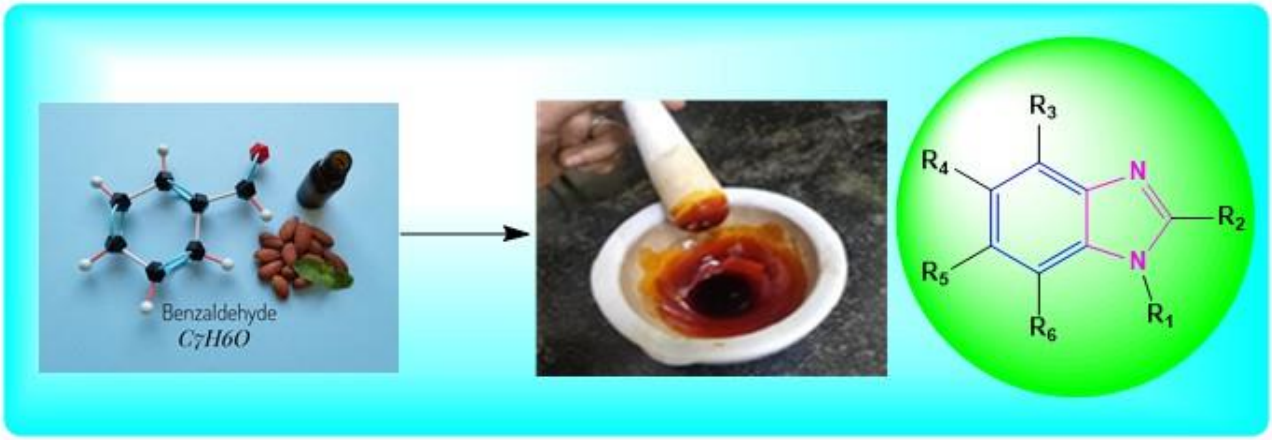
The findings showed that the Ayurvedic clove-scented candle had stable burning qualities, little smoke, and a pleasant, lingering scent. Clove essential oil helped purify the air and produced a relaxing, revitalizing ambiance.

Keywords: Ayurvedic clove-scented candle, beeswax or soy wax, lingering scent

Green Synthesis of Benzimidazole and Its Derivatives via Solvent-Free Mortar and Pestle Technique

Vishakha Pawar*[1], Shuwaiba Takey[1], Soima Mukadam[1], Sameer Mohamad[1], Dr. Namita More*[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*



Graphical Abstract: Synthesis of benzimidazole derivatives using green approach

Abstract: In light of its many biological and pharmacological activities, such as antibacterial, antiviral, anti-cancer, anti-inflammatory, and antifungal qualities, benzimidazole and its derivatives make up an important class of heterocyclic chemicals. Benzimidazo's structural stability and biological significance are attributed to its formation as a bicyclic heterocycle by the fusion of benzene and imidazole rings. In organic and medicinal chemistry, the synthesis of benzimidazole has garnered significant interest. As a result, a variety of synthetic techniques have been developed with the goal of enhancing yield, efficiency, selectivity, and environmental sustainability. Benzimidazoles are typically produced by condensing ophenylenediamine with carboxylic acids, aldehydes, or their derivatives under acidic or oxidative conditions. Functional group tolerance may be limited by the severe reaction conditions, lengthy reaction periods, and strong acids that are frequently required by classical techniques. Numerous other strategies, including as one-pot multicomponent processes, solvent-free reactions, and microwave-assisted synthesis, have been investigated to get around these problems. To increase reaction speeds and product yields, modern protocols use catalysts including Lewis acid, Brønsted acids, metal salts (such as Cu, Fe, and Zn), and heterogeneous catalysts.

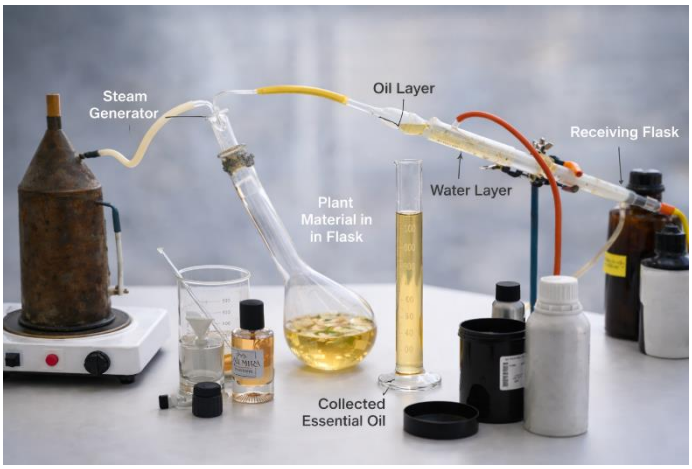
Green chemistry concepts are emphasized in recent developments, which make use of reusable catalysts, environmentally friendly solvents, and softer reaction conditions.

Keywords: Benzimidazo, Anti-inflammatory, Antifungal, Lewis acid, Brønsted acids, Metal salts

Preparation and analysis of natural perfume using Steam Distillation

Pankaj Gaikwad[*1], Sufiyan M. Gangrekar[1], Dr. Namita More[1]

[1]*D.G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad, 402-104.*



Graphical Abstract: Preparation of natural perfume using Steam Distillation

Abstract: Steam distillation is the most used technique for extracting essential oils because of its ease of use and low cost. Technological advancements offer a huge chance to enhance this aspect of essential oil production because of the significance of this extraction approach. We undertook a technological prospection in this study to assess how such upgrades have been used to the manufacturing of essential oils. A total of 490 patent papers were retrieved, and factors such as publication patterns, the primary depositing nations and potential markets for the inventions, the primary applicants and inventors of the prospective technologies, and the categorization codes assigned to the patent documents were assessed. The findings showed that steam distillation is a significant industrial process that has been expanding recently and that it is utilized by various industries. Regarding related technological advancements, we found that only a few patent documents mentioned their application, suggesting that procedures could still be researched and integrated into the technology. Therefore, the development of research to enhance this procedure may further add to its apparent growth.

Keywords: Steam distillation, Essential oil, Apparent growth, Natural Perfume

Sonophotocatalytic Degradation of Methyl Orange Using Pineapple Pericarp–Derived ZnO Nanoparticles: A Green Wastewater Treatment Approach

Aamod Thakkar [1] Kalapana Jain [2] Anil Palve [3] Gurumeet C Wadhawa [4]

1. I/C Principal Veer Wajekar ASC College, Phunde Uran

2. Professor and Principal Royal College Mira Road

3. Professor and Head Department of Chemistry Veer Wajekar ASC College, Phunde Uran

4. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran

Abstract: The rapid growth of textile and dyeing industries has led to the discharge of hazardous dyes into aquatic ecosystems, posing serious environmental and health risks. Methyl orange is a commonly used azo dye that is highly stable and resistant to conventional wastewater treatment methods. Semiconductor-based advanced oxidation processes, particularly those using green-synthesized nanoparticles, have emerged as sustainable alternatives. Zinc oxide nanoparticles derived from agricultural waste offer an eco-friendly and cost-effective solution for environmental remediation. This study aims to evaluate the efficiency of pineapple pericarp–derived zinc oxide nanoparticles (PP–ZnO NPs) as a green sonophotocatalyst for the degradation of methyl orange dye in aqueous medium. PP–ZnO nanoparticles were synthesized using pineapple pericarp extract via a green route. Photocatalytic and sonophotocatalytic degradation of methyl orange (10 mg/L) was carried out using PP–ZnO NPs (0.5 g/L) under UV/visible light irradiation combined with ultrasonic treatment at room temperature. The reaction was performed in alkaline medium after establishing adsorption–desorption equilibrium in the dark. The degradation progress was monitored using UV–Visible spectroscopy at 464 nm. The PP–ZnO nanoparticles exhibited excellent catalytic activity toward methyl orange degradation. A significant reduction in dye concentration was observed within 60 minutes of irradiation, achieving more than 90% degradation under sonophotocatalytic conditions. The enhanced efficiency was attributed to the synergistic effect of light and ultrasonic irradiation, which promoted the generation of reactive oxygen species such as hydroxyl and superoxide radicals. Pineapple pericarp–derived ZnO nanoparticles serve as an efficient, sustainable, and low-cost sonophotocatalyst for the degradation of methyl orange dye. This green approach integrates waste valorization, nanotechnology, and advanced oxidation processes, offering a promising strategy for environmentally friendly wastewater treatment.

Biogenic ZnO Nanoparticle Catalyzed Green Synthesis of Benzothiazoles under Ultrasonic Irradiation

Kalapana Jain [1] Gurumeet C Wadhawa [2] Anil Palve [3] Aamod Thakkar [4]

1. Professor and Principal Royal College Mira Road

2. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran

3. Professor and Head Department of Chemistry Veer Wajekar ASC College, Phunde Uran

4. I/C Principal Veer Wajekar ASC College, Phunde Uran

Abstract: Green chemistry focuses on the development of environmentally benign and sustainable synthetic methodologies that minimize hazardous chemicals, reduce energy consumption, and utilize renewable resources. Recently, biogenic metal oxide nanoparticles prepared from agricultural waste have emerged as promising green catalysts. Ultrasonic irradiation is another eco-friendly technique that accelerates organic reactions under mild conditions. Benzothiazole derivatives are an important class of heterocyclic compounds with wide applications in medicinal, agricultural, and material sciences. The present study aims to develop a green, efficient, and sustainable protocol for the synthesis of substituted benzothiazoles using pineapple pericarp waste–derived zinc oxide nanoparticles (PP–ZnO NPs) as a heterogeneous catalyst under ultrasonic irradiation. Substituted benzothiazoles were synthesized via the cyclocondensation of 2-aminothiophenol with various substituted aldehydes in aqueous medium. Pineapple pericarp–assisted ZnO nanoparticles were employed as a recyclable nanocatalyst. Ultrasonic irradiation at ambient temperature was used to promote the reaction, avoiding harsh reaction conditions, toxic solvents, and expensive catalysts. The biogenic ZnO nanoparticles were prepared using pineapple pericarp extract, representing a waste-to-wealth approach.
The ultrasonic-assisted protocol afforded rapid formation of benzothiazole derivatives within short reaction times, giving excellent yields and high product purity. The PP–ZnO nanoparticles exhibited high catalytic activity and selectivity. The catalyst was easily separated and reused for multiple cycles without significant loss of efficiency, demonstrating its practical applicability and sustainability.

Green Microwave-Assisted Synthesis of Bisnaphthols Using Pineapple Pericarp–Derived ZnO Nanoparticles

Maryappa C Sonawale [1] Smita Tandale [2] Chetana Tumade [3] Gurumeet C Wadhawa [4]

1. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran
2. Professor and Department of Chemistry Veer Wajekar ASC College, Phunde Uran
3. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran
4. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran

Abstract: Bis-naphthols are an important class of compounds widely used as intermediates in pharmaceuticals, dyes, agrochemicals, and asymmetric catalysis. Conventional synthetic methods for bis-naphthols often require strong acids, toxic solvents, prolonged reaction times, and harsh conditions, leading to environmental and safety concerns. Green chemistry approaches employing heterogeneous nanocatalysts and microwave irradiation offer sustainable alternatives by reducing energy consumption, reaction time, and waste generation. The present study aims to develop a rapid, efficient, and eco-friendly protocol for the synthesis of bis-naphthol derivatives using pineapple pericarp–derived zinc oxide nanoparticles (PP–ZnO NPs) as a recyclable catalyst under microwave irradiation. Bis-naphthols were synthesized via the one-pot condensation of β-naphthol with various aromatic aldehydes under solvent-free conditions. Pineapple pericarp–assisted ZnO nanoparticles were employed as a heterogeneous nanocatalyst. Microwave irradiation was used to accelerate the reaction, enabling completion within minutes. The catalyst was recovered by simple filtration and reused for successive reaction cycles.

The microwave-assisted protocol afforded bis-naphthol derivatives in excellent yields within significantly reduced reaction times compared to conventional heating. PP–ZnO nanoparticles exhibited high catalytic efficiency and selectivity, and the method tolerated a wide range of aldehydes bearing electron-donating and electron-withdrawing substituents. The catalyst retained its activity over multiple reuse cycles, demonstrating good stability and reusability. The developed pineapple pericarp–derived ZnO nanoparticle catalyzed microwave method represents a green, sustainable, and efficient approach for the synthesis of bis-naphthols. The methodology aligns with key principles of green chemistry, including waste valorization, solvent-free synthesis, energy efficiency, and catalyst recyclability, making it attractive for both academic and industrial applications.

Sustainable Aqueous-Phase Synthesis of Benzimidazoles Using Fruit Waste Derived ZnO Nanocatalyst under Ultrasonic Irradiation

Kalapana Jain [1] Gurumeet C Wadhawa [2] Anil Palve [3] Aamod Thakkar [4]

1. Professor and Principal Royal College Mira Road

2. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran

3. Professor and Head Department of Chemistry Veer Wajekar ASC College, Phunde Uran

4. I/C Principal Veer Wajekar ASC College, Phunde Uran

Abstract:

Green chemistry emphasizes the development of sustainable synthetic methodologies that minimize environmental impact by reducing hazardous reagents, solvents, and energy consumption. In this context, alternative energy sources and bio-waste–derived catalysts have attracted growing attention. Ultrasonic irradiation is recognized as an efficient green technique that accelerates organic reactions under mild conditions, while biogenic metal oxide nanoparticles prepared from agricultural waste offer an eco-friendly substitute to conventional catalysts.The present study aims to develop a green, one-pot multistep protocol for the synthesis of substituted benzimidazoles using pineapple pericarp waste–assisted zinc oxide nanoparticles (PP–ZnO NPs) as a heterogeneous catalyst under ultrasonic irradiation in aqueous medium.Substituted benzimidazoles were synthesized via the condensation of o-phenylenediamine with various substituted aldehydes in water using pineapple pericarp–assisted ZnO nanoparticles as a recyclable catalyst. Ultrasonic irradiation at ambient temperature was employed to promote the cyclocondensation reaction. The method replaces conventional homogeneous catalysts with a sustainable nanocatalyst derived from fruit waste, aligning with waste-to-wealth and green chemistry principles. The ultrasonic-assisted protocol enabled rapid formation of benzimidazole derivatives within short reaction times, affording excellent yields under mild conditions. The PP–ZnO nanoparticles exhibited high catalytic efficiency and chemoselectivity, promoting clean reactions in aqueous medium. The catalyst was easily recovered and reused without significant loss of activity, demonstrating its practical applicability.The developed pineapple pericarp–assisted ZnO nanoparticle catalyzed ultrasonic method provides a simple, efficient, and environmentally benign route for the synthesis of substituted benzimidazoles. This approach integrates multiple green chemistry concepts, including waste valorization, aqueous-phase synthesis, energy-efficient sonochemistry, and recyclable nanocatalysis. Owing to the wide range of biological activities of benzimidazole derivatives, this sustainable methodology offers a valuable platform for the rapid synthesis of pharmacologically important heterocycles.

Green Microwave-Assisted Synthesis of Substituted Benzimidazole Using Nickel Chloride as an Efficient Catalyst

Gurumeet C Wadhawa [1] Kalapana Jain [2] Anil Palve [3] Aamod Thakkar [4]

1. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran

2. Professor and Principal Royal College Mira Road

3. Professor and Head Department of Chemistry Veer Wajekar ASC College, Phunde Uran

4. I/C Principal Veer Wajekar ASC College, Phunde Uran

Abstract

Green chemistry is a rapidly emerging field focused on designing chemical processes that minimize or eliminate the use and generation of hazardous substances. Microwave Induced Organic Reaction Enhancement (MORE) has gained significant attention as a green synthetic technique due to its simplicity, cleanliness, speed, energy efficiency, and cost-effectiveness. Compared to conventional heating methods, microwave-assisted synthesis drastically reduces reaction times from hours to minutes, enhances reaction rates by 10–1000 times, and improves product yields by 10–30%, while also decreasing environmental pollution. The present study aims to develop an eco-friendly, rapid, and efficient method for the synthesis of substituted benzimidazole using microwave irradiation under solvent-free conditions, employing nickel chloride ($NiCl_2$) as a catalyst, and to highlight the relevance of these compounds due to their broad pharmacological importance. Substituted benzimidazole were synthesized via the condensation of o-phenylenediamine with various aromatic, unsaturated, and aliphatic aldehydes under microwave irradiation. The reactions were carried out under solvent-free conditions using nickel chloride as a mild and inexpensive catalyst. Microwave heating was employed to accelerate the cyclocondensation process, replacing conventional reflux methods that require prolonged heating and complex apparatus. The microwave-assisted protocol provided rapid conversion of reactants to the desired benzimidazole derivatives within minutes, affording higher yields compared to conventional thermal methods. The use of $NiCl_2$ as a catalyst proved effective in promoting the reaction under mild and green conditions. The method demonstrated broad substrate scope, tolerating different classes of aldehydes, and produced products with good purity.

The developed microwave-assisted, solvent-free synthesis of substituted benzimidazole using nickel chloride as a catalyst represents a green, efficient, and sustainable alternative to conventional synthetic methods. This approach aligns well with the principles of green chemistry by reducing reaction time, energy consumption, solvent use, and environmental impact. Given the wide spectrum of biological activities associated with benzimidazole derivatives, this methodology provides a valuable platform for the rapid generation of pharmacologically important heterocycles.

Flaxseed (Linum usitatissimum): A Nutritional Powerhouse with Significant Health Benefits

Gurumeet C Wadhawa [1] Kalapana Jain [2] Anil Palve [3] Aamod Thakkar [4] Shubham Babar

1. Assistant Professor Department of Chemistry Veer Wajekar ASC College, Phunde Uran

2. Professor and Principal Royal College Mira Road

3. Professor and Head Department of Chemistry Veer Wajekar ASC College, Phunde Uran

4. I/C Principal Veer Wajekar ASC College, Phunde Uran

5.Student Department of Chemistry Veer Wajekar ASC College, Phunde Uran

ABSTRACT: Flaxseed (*Linum usitatissimum*), commonly known as linseed, is a blue-purple flowering plant widely recognized for its exceptional nutritional and therapeutic value. It is a rich plant-based source of dietary fiber, omega-3 fatty acids—particularly alpha-linolenic acid (ALA)—and bioactive compounds such as lignans, which exhibit strong antioxidant properties. Regular consumption of flaxseed has been associated with numerous health benefits, including the reduction of total cholesterol and low-density lipoprotein (LDL) cholesterol levels, thereby contributing to improved cardiovascular health. Additionally, flaxseed plays a beneficial role in weight management by promoting satiety and enhancing metabolic function. Its anti-inflammatory properties help in reducing the risk of chronic inflammatory disorders. Emerging research also highlights the potential of flaxseed in lowering the risk of certain cancers, particularly hormone-related cancers, due to its phytoestrogen content. Incorporating small quantities of flaxseed into the daily diet can lead to significant improvements in overall health. Thus, flaxseed can be considered a functional food and a natural source of disease-preventive compounds, making it an important component of a balanced and health-promoting diet.

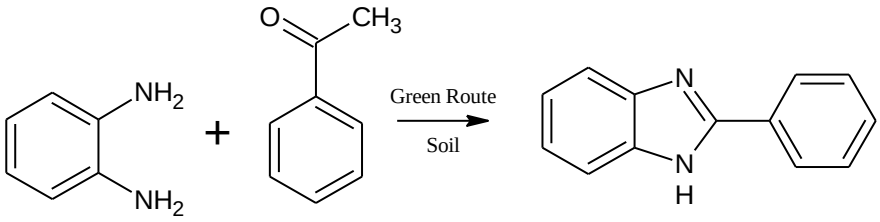
Synthesis of 2-Alkanamino Benzimidazole Derivatives using plant assisted Nano particles – Green Approach

Pranit Mahatre, Anushka Killekar

[1,2,3] Undergraduate Student Veer Wajkar College,Phunde

ABSTRACT: Benzimidazole and its derivatives have different biological activity. they have various biological sports like antimicrobial, antiviral, antidiabetic, anticancer, interesting. Unique benzimidazole derivatives in good yield were organized by condensation of orthophenyldiamine with an aromatic aldehyde in the presence of Soil under sonication. The response carried the use of inexperienced course and economically viable.

Keyword: *o*-Phenylenediamine, catalyst, green route.



APPLICATION OF FLAXSEED CURD

Anushka Mhatre [1], Komal Patil [2],Gurumeet C Wadhawa [3]

[1,2] Student Post Graduate Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

[3] Assistant professor in Student Post Graduate Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

ABSTRACT: Flax, also known as Linseed, is a blue- purple flowered plant. Flaxseed is a plant- based that provides healthful fat, antioxidants and fiber. Flaxseeds are a good source of dietary fiber and omega-3 fatty acids, including alpha-linolenic acid. Flaxseed may also help lower total blood cholesterol and low-density lipoprotein cholesterol levels. A small change in diet can give better results for your health and adding a very little amount of flaxseed in your diet will give you major benefits as flax is a powerhouse of disease-fighting compounds that researchers have found to prevent heart disease , helps in weight loss, protect against inflammatory disorders and certain cancers, and lower cholesterol.

Comparative study to determine the quality and natural ripening of banana

Jamku chadana,[1] pranali satpute,[2] Gurumeet C Wadhwa [3]

[1,2] Student Post Graduate Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

[3] Assistant professor in Student Post Graduate Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

Abstract: A comparative study on the physico-chemical properties of naturally ripened and artificially ripened bananas was carried out. Calcium carbide was chosen as ripening agent. The banana samples were collected and ripened naturally and artificially in the laboratory by dividing the banana samples into three groups 1,2and3. Group 1 was ripened with 0.25 grams calcium carbide in one litre and Group 2 using 1 ml Ethephon in one litre.and Group 3 was ripened naturally. The results revealed that naturally ripened banana samples took 6 - 8 days to ripe, whereas those ripened with calcium carbide at 0.25 gram and Ethephon 1ml respectively took 2 - 4 days to ripe. Total soluble solids, moisture, sugar content, firmness, texture and taste were found higher in the naturally ripened banana samples than the artificially ripened banana sample. The Vitamin C content of artificially ripened banana sample was lower than the naturally ripened samples. The overall sensory evaluations of naturally ripened banana samples were higher than the calcium carbide ripened banana samples. The study concluded that natural method of banana ripening is better than artificial method of banana ripening and it gives beneficial effects without toxicity.

Keywords: artificial ripening,calcium carbide, ripening agent, Ethephon, banana.

NANO COPPER AS A PROMISING NANO FERTILISER FOR SUSTAINABLE AGRICULTURE

Komal Patil [1], Anushka Mhatre [2],Gurumeet C Wadhawa [3]

[1,2] Student Post Graduate Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

[3] Assistant professor in Student Post Graduate Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

ABSTRACT: Agriculture plays a vital role in India's economy as it accounts for about 18% of India's GDP and it provides employment to nearly 50% of India's population. But due to excessive use of chemical fertilizers, India is witnessing major consequences such as decreased fertility of soil, human health issues, water, soil and air pollution, etc. The ideal NPK (Nitrogen, Phosphorous , Potassium) ratio should be 4:2:1 ; but according to systematic country diagnostic report , in Punjab it was found to be 62:19:1 which is much more than the ideal one. Due to this India's agriculture is reducing its productivity. Hence we need to focus on sustainable agriculture. Nano fertilizer will be helpful in solving this issue as they are capable of providing targeted delivery of nutrients to specific plant tissues, resulting in improved plant growth and higher yields.

Fermented Pumkin Squash

Smita Tandale [1], Saniya Patil [2]

1 Student Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

[2] professor Post Graduate Department of Chemistry, Veer Wajekar ASC College,Phunde,Uran,Raigad

Abstract : Flavorful, vibrant, and tangy, fermented winter squash chutney is the perfect side for roasted meats or roasted vegetables. You can also use it over rice, sweet peas or lentils. The flavor of this chutney compliments so many different dishes. Most importantly, this fermented chutney makes your meals more nutritious and absolutely delicious. If you want to learn how to make the perfect fermented winter squash chutney,. Feel the weight of the winter squash. The squash should be heavy for its size. Heavier winter squash means soft and moist flesh, which is exactly what you want for the fermented winter squash chutney. The stem of the winter squash should be firm, dry, and intact. Avoid any squash that has a soft stem because that means the winter squash is past its prime. analyze the surface of the winter squash. You want a squash that has a rich color, preferably without any pale spots. Unless the pale spot is at the bottom, where the squash rested on the ground. You also want a matte and dull-looking squash. If the surface is shiny, it can mean the squash was picked too early. Lastly, check the skin for cracks and cuts. You don't want any soft spots or cracks on the surface because these can also mean that the squash was picked too early. Not to mention, soft spots can facilitate the growth of mold.

Effective Pest Management by the Methyl Eugenol Nano gel

Gurumeet C Wadhawa, Yashwant A Gaikwad

Assistant Professor, Department of Chemistry Veer Wajekar ASC College Phunde

Abstract: Environment-friendly management of fruit flies involving pheromones is useful in reducing the undesirable pest populations responsible for decreasing the yield and the crop quality. A nanogel has been prepared from a pheromone, methyl eugenol (ME) using a low-molecular mass gelator. This was very stable at open ambient conditions and slowed down the evaporation of pheromone significantly. This enabled its easy handling and transportation without refrigeration and reduction in the frequency of pheromone recharging in the orchard. Notably the involvement of the nano-gelled pheromone brought about an effective management of *Bactrocera dorsalis*, a prevalent harmful pest for a number of fruits including guava. Thus a simple, practical and low cost green chemical approach is developed that has a significant potential for crop protection, long lasting residual activity, excellent efficacy and favorable safety profiles. This makes the present invention well-suited for pest management in a variety of crops.

Key words: Nanogel,Pest Mangment

One-Pot Four-Component Dakin-West Synthesis of β-Acetamido Ketones Catalyzed by Red mud soil

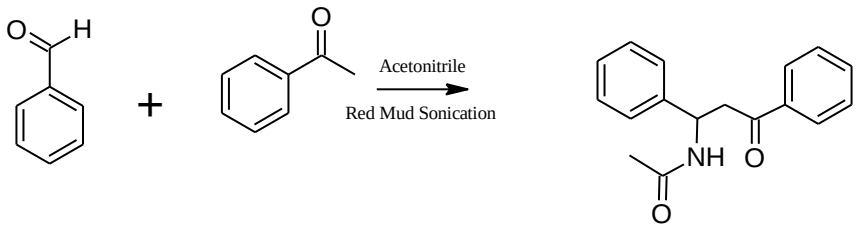
Gurumeet C Wadhawa[1], Vitthal S. Shivankar[2], Yashwant A. Gaikwad[1],

[1]Assistant Professor Department of Chemistry Veer Wajekar ASC College,Phunde,Uran
[2].Principal,Rayat Shikshan Sansthas Chatrapati Shivaji College,Satara

[*] *Correspondence: E-mail: wadhava.gurumeet@gmail.com*

Abstract: the multicomponent condensation of aryl aldehyde acetyl chloride, acetonitrile, and enolizable ketone as one-pot synthesis of β-acetamido ketones in high yields was studied using highly commercial, non-corrosive, and environmentally benign catalyst like Red soil as catalysts. The best catalyst was Red soil. The method was used simple experimental conditions, and the very short reaction times and good high yields indicate it is a very useful strategy for the large scale synthesis of β-acetamido ketones.

Key words: heterogeneous catalysis; Red soil -Dawson; Dakin-West; β-acetamido ketone



Publisher: D. G. Tatkare Mahavidyalay of Arts, Science, Commerce, IT & Management, Mangaon - Raigad

Magnesium Sulphate Catalysed Synthesis of 1, 5-Benzothiazepines using Sonication Method

Yashwant A. Gaikwad[1],Vitthal S. Shivankar[2], Gurumeet C Wadhawa[1]

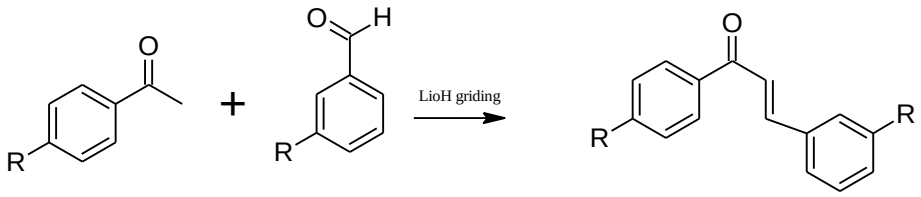
[1]Assistant Professor Department of Chemistry Veer Wajekar ASC College,Phunde,Uran
[2].Principal,Rayat Shikshan Sansthas Chatrapati Shivaji College,Satara

[*] *Correspondence: E-mail:* yashwantg5670@gmail.com

ABSTRACT: One step synthesis of various aromatic substituted, 1-5-benzothiazepines carried by the reaction of different substituted chalcone with ortho-aminothiophenol in sonication at 40 ^{0}C using Magnesium Sulphateas catalyst This reaction method is mild reaction condition, very short reaction time as compared to the other conventional methods. The structural assignment of the final product has been done by spectral techniques or other techniques.

Keywords: Different substituted chalcone; ortho-aminothiophenol; Magnesium Sulphate and sonication short reaction time.

Scheme -1



Scheme 2