Heterocyclic Letters
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GRAPHICAL ABSTRACT

Paper-1	Heterocyclic Letters 15: iss.-4 (2025), 671-674

Grindstone Chemistry: Acid-Catalyzed Facile Synthesis of Coumarins

M. Amin Mir,[1] Ram Naresh Yadav[2], Somdatta Mukherjee*[3], Subhendu N. Ganguli*[3], and Bimal Krishna Banik*[1]

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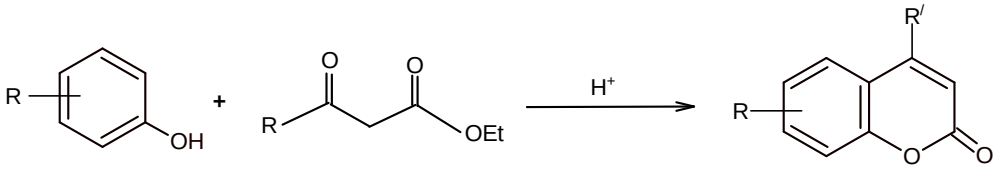

Paper-2	Heterocyclic Letters 15: iss.-4 (2025), 675-679

Ultrasound-Induced Synthesis of Oxazines from Nitro-β-Lactams: Scope of the Reducing Agents

Aarif L Shaikh[1, 2], Devidas B Patil[1], Vivek S Gaware[1] and Bimal Krishna Banik [3]*

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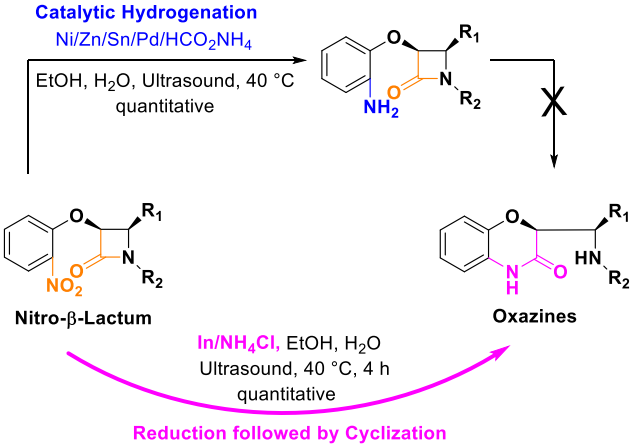
The catalytic hydrogenation using H_2, 10% Pd/C, Ni, Sn or Zn and transfer hydrogenation using HCO_2NH_4, only facilitates the reduction of nitro-substituted β-lactams. However, under these conditions, further cyclization to form oxazines could not be achieved under mild ultrasonic condition at 40 °C in aqueous EtOH. Whereas, under similar reaction conditions, In/NH_4Cl facilitated reduction followed by spontaneous cyclization through a molecular rearrangement to afford corresponding oxazines.



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Paper-3	Heterocyclic Letters 15: iss.-4 (2025), 681-686

Facile One-Pot Synthesis of 3-Hydroxy-β-Lactams by Grinding

Aarif L Shaikh[1], Sachin A Khade[2], Pallavi D Bhange[2], and Bimal Krishna Banik[3]*

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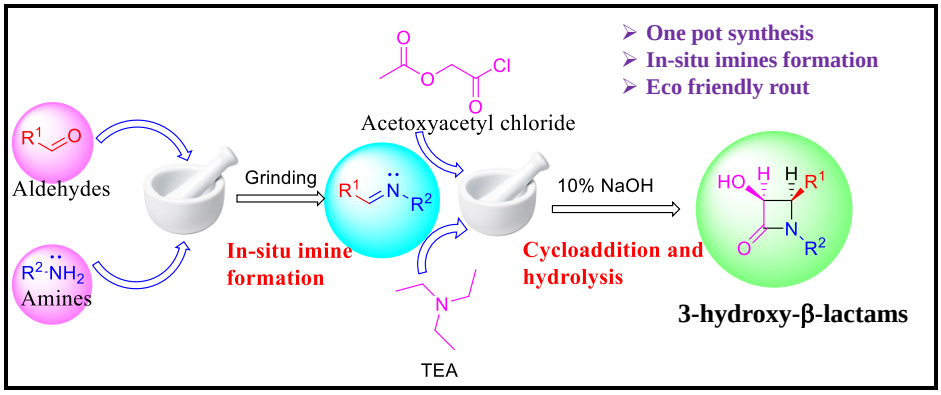

Paper-4	Heterocyclic Letters 15: iss.-4 (2025), 687-691

Improved Scalable Synthesis of 2,4-Diazabicyclo[*3.1.0*]hexan-3-one

Ramesh Gaikwad[1], Vivek S Gaware[1], Devidas Patil[1], George W Kabalka[2] and Aarif L Shaikh[1, 2]*

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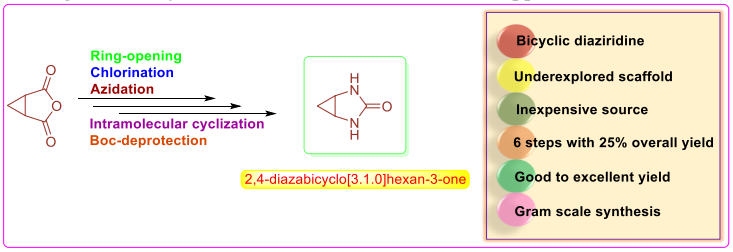
An efficient and versatile synthetic strategy has been developed for the construction of 2,4-diazabicyclo[*3.1.0*]hexan-3-one (bicyclic diaziridines), a structurally unique and underexplored scaffold of considerable interest in synthetic and medicinal chemistry. The sequence involves an initial ring-opening step, followed by chlorination, azidation, and intramolecular cyclization, culminating in a key Boc-deprotection step that furnishes the target bicyclic diaziridine core in six steps with 25% overall yield. The method is scalable and offers a robust platform for accessing novel bicyclic diaziridine motifs for further applications.



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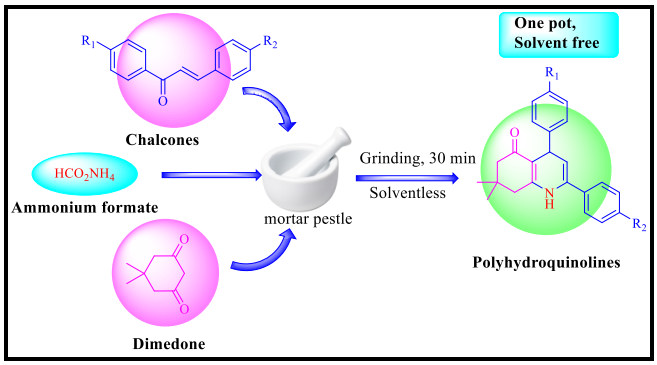
Paper-5	Heterocyclic Letters 15: iss.-4 (2025), 693-698

One Pot and Solvent-Free Synthesis of Polyhydroquinoline By Mechanochemical Grinding

Aarif L Shaikh[1], Sachin A Khade[2], Pallavi D Bhange[2], and Bimal Krishna Banik[3]*

[1]Infinia Science Pvt Ltd, Chemistry Solutions, Plot No. T-169, Bhosari MIDC, Pune-411026, Maharashtra, India; [2]School of Chemical Sciences, Sanjay Ghodawat University, Atigre, Kolhapur-416 118, Maharashtra, India; [3]Department of Mathematics and Natural Sciences, College of Sciences and Human Studies, Deanship of Research, Prince Mohammad Bin Fahd University, Al Khobar 31952, Kingdom of Saudi Arabia; bimalbanik10@gmail.com

A solvent-free, environmentally friendly, one-pot synthesis of polyhydroquinoline derivatives by mechanochemically grinding ammonium formate, dimedone, and chalcones with a mortar and pestle.



Paper-6	Heterocyclic Letters 15: iss.-4 (2025), 699-711

Design and synthesis of novel derivatives of chlorobenzyl-tetrazole and studying them for antibacterial and antifungal activities

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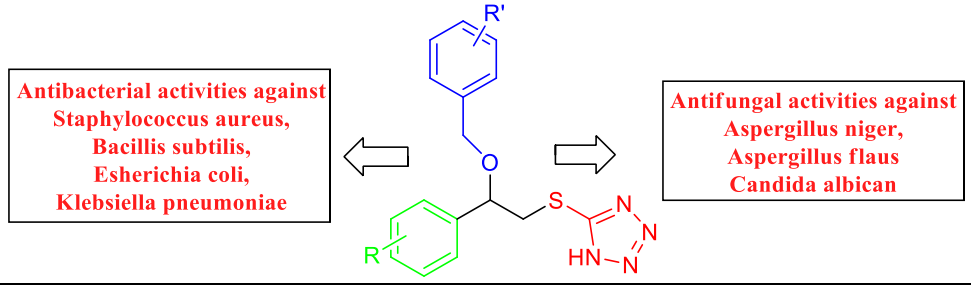
Synthesis of a novel series of substituted chlorobenzyl-tetrazole derivatives and screened for their antibacterial and antifungal activities. Pharmaceutical investigation studies revealed that the most of newly synthesized compounds exhibits good antibacterial and antifungal activities against all the tested strains regarding the reference drug.



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Paper-7	Heterocyclic Letters 15: iss.-4 (2025), 713-722

Three component one pot synthesis of 1, 8-Acridinedione derivatives using [(Diacetoxyiodo)benzene] (DIB) under solvent free conditions

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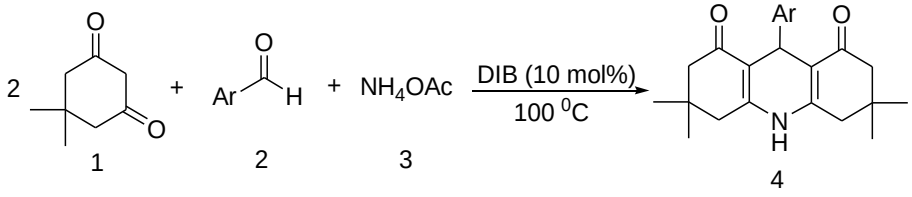
An efficient and convenient protocol is developed for the synthesis of 1, 8-acridinedione derivatives by a one pot, three component condensations of dimedone, aldehydes and ammonium acetate in the presence of catalytic amount of DIB at solvent free condition.



Paper-8	Heterocyclic Letters 15: iss.-4 (2025), 723-729

Design, synthesis, characterization and antibacterial screening of 4-thiazolidinone-pyrazole heterocyclic conjugates

S. V. Manohare[a]* and S. S. Thakare[b]

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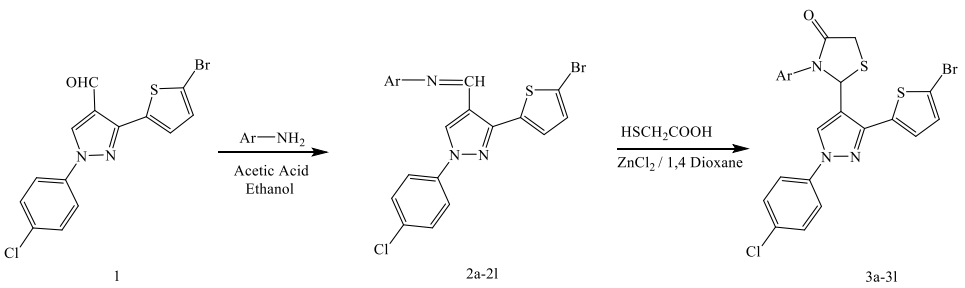

Compound	3a	3b	3c	3d	3e	3f	3g	3h	3i	3j	3k	3l
Ar	C_6H_5	4-Cl-C_6H_4	2-Cl-C_6H_4	3-Cl-C_6H_4	4-Br-C_6H_4	2-NO_2-C_6H_4	3-NO_2-C_6H_4	4-NO_2-C_6H_4	4-OH-C_6H_4	2-OH-C_6H_4	3-OH-C_6H_4	4-CH_3-C_6H_4

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Paper-9 | Heterocyclic Letters 15: iss.-4 (2025), 731-744

Synthesis, antimicrobial and antioxidant screening of some novel indole derivatives containing guanidine moiety

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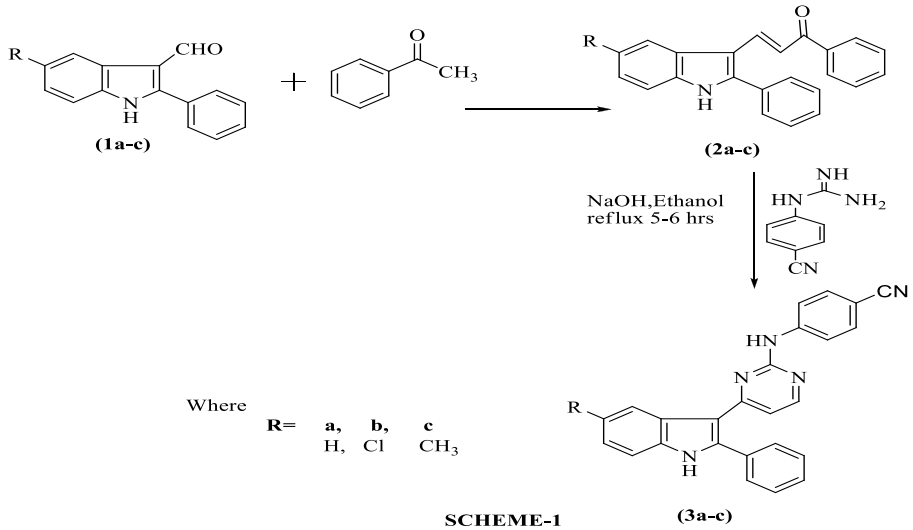
Several novel compounds 1-phenyl-3-(2-phenyl-1*H*-indol-3-yl)prop-2-en-1-ones (**2a-c)** and 4-(4-(2-phenyl-1*H*-indol-3-yl)pyrimidin-2-ylamino)benzonitriles (**3a-c**) were synthesized. The structures of these newly synthesized compounds were confirmed by their elemental analyses and spectral characterization. These compounds have been tested for their antimicrobial and antioxidant activities.



SCHEME-1

Paper-10 | Heterocyclic Letters 15: iss.-4 (2025), 745-760

Design, synthesis and biological evaluation of novel metal complexes of 1,3,4-thiadiazole with therapeutic potential

Bhakti S. Kajrekar[a*], Shrutika Sakpal[b], Vandana Kamble[c]

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[b]*Department of Chemistry, The Institute of Science, Dr. Homi Bhabha State University, Mumbai, Maharashtra- 400032. India.*
[c]*Department of Forensic Science, The Institute of Science, Mumbai, Maharashtra- 400032. India.*
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Different metal-based complexes containing ligands resorcinol and beta naphthol were synthesized and characterized. The findings of this study demonstrate the potential of metal-based compounds as promising antimicrobial and antifungal agents, particularly $Cu\text{-}L_{18}$, which exhibited the most potent inhibition against both bacterial and fungal pathogens..This resulted in the formation of stable coordination complexes.

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Paper-11	Heterocyclic Letters 15: iss.-4 (2025), 761-772

Pyrazole-thiophene hybrids as anti-inflammatory and analgesic agents: *insilico* approach

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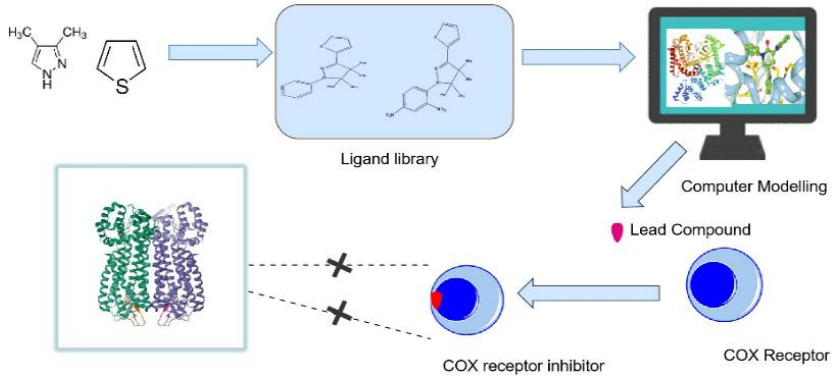
Faculty of Pharmaceutical Sciences, Assam Downtown University, Assam-781026



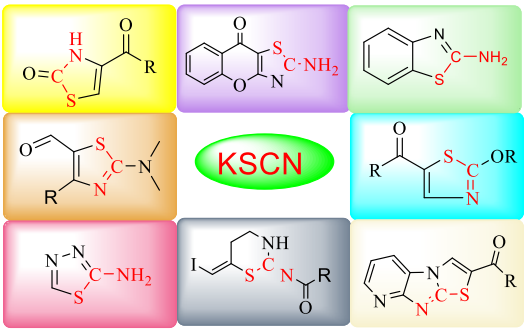
Paper-12	Heterocyclic Letters 15: iss.-4 (2025), 773-783

Potassium thiocyanate as a versatile inorganic surrogate for heterocyclic synthesis: a decade review

Siva Senthil Kumar Boominathan

Department of Chemistry, Sri Ramakrishna Mission Vidyalaya College of Arts and Science, Coimbatore-641020, Tamilnadu, India.

Potassium thiocyanate (KSCN), an inexpensive and sustainable thiocyanate source, has emerged as a versatile reagent for heterocyclic synthesis. Its ambident nucleophilicity enables C–S and C–N bond formation through diverse pathways like oxidative cyclization, radical annulation, electrophilic substitution, and metal-catalyzed coupling. This review highlights recent KSCN-based strategies offering broad substrate scope, operational simplicity, and high atom economy.



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Paper-13 | Heterocyclic Letters 15: iss.-4 (2025), 785-796

Design, synthesis, molecular docking and evaluation of substituted chalcone- quinazoline hybrid derivatives

L. Kawale[a], P. Bobade[a], V. Kharat[a], V. Nade[b], R. Deshmukh[c], M. Dumbare[a]*

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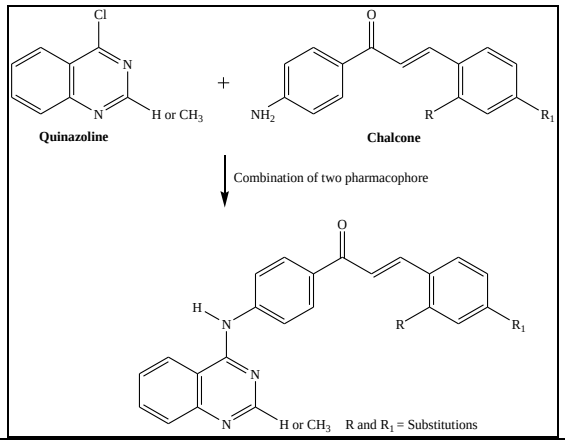
***Corresponding author E-mail:** ramvijay161982@gmail.com*

Novel quinazoline–chalcone hybrids were designed by combining bioactive chalcones with heterocyclic cores like quinazoline and quinazolinone to enhance therapeutic potential.



Paper-14 | Heterocyclic Letters 15: iss.-4 (2025), 797-805

Heterocyclic compounds of gmelina arborea plant leaf extract-mediated biosynthesis and characterization of stable silver, gold nanoparticles, and their nanoalloys

Gajanan Hegde [a,b*] and Tanuja Kadre [b]

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This paper described a synthesis that involved the bioreduction of silver and gold ions with a Gmelina leaf extract containing heterocyclic compounds. Discrete analytical tools are applied to characterize the silver, gold, and Ag-Au alloy NPs. The SPR band observed for Au (~556 nm), Ag (~434 nm), and Au–Ag (~512 nm) is consistent with the information in the literature. These prepared NPs are all easily dispersed and have distinct fcc crystal structures. TEM images reveal that the particles are nearly spherical (20–50 nm). FT-IR spectra and TG curves exhibit that these NPs were in situ bio-capped by plant extract heterocyclic biomass during the formation process. Further studies are required to explain its potential applications in the biomedical field

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Paper-15 | Heterocyclic Letters 15: iss.-4 (2025), 807-823

Antifungal activity of Peppermint and Origanum essential oil proportions against oral Candida albicans - In vitro study

Shilpa Mailankote[1], Manoj Shetty[2], Akshay Byrapura Manjappa[3], Payaradka Rajesha[4], Shriya Chandrakant Shetty[5], Mohana Kumar Basavarajappa[6], A Veena Shetty[7]

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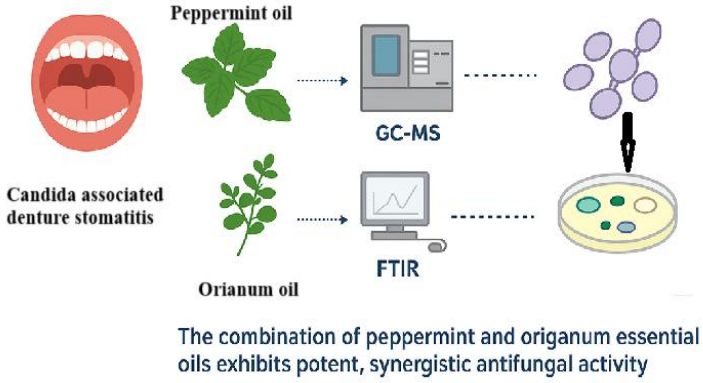

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Paper-16	Heterocyclic Letters 15: iss.-4 (2025), 825-832

In situ recrystallized eco-friendly multicomponent synthesis of biologically active tetrahydrobenzo [b] pyran derivatives using novel ni-doped-ag nanocatalyst.

Vaishnav D. Gharat[a], Rupa R. Bogati[a*] and Swapnali L. Shendri[a]

[a]*Karnatka Lingayat Society's Commerce and Science College, Kalamboli, Navi Mumbai, 410 218, Maharashtra, India. Department of Chemistry,*
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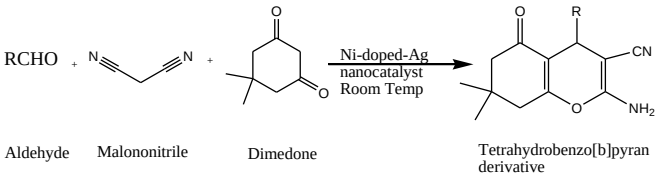
An environmentally friendly, one-pot, in-situ recrystallized synthesis of tetrahydro benzo[b]pyran compounds was accomplished by reacting aromatic aldehydes, dimedone, and malononitrile with a new Ni-doped Ag nanocatalyst. Good to exceptional yields were obtained from the reaction, which took place in ethanol as the solvent under mild conditions. By eliminating the requirement for chromatographic purification of the products, in-situ recrystallization made workup easier.



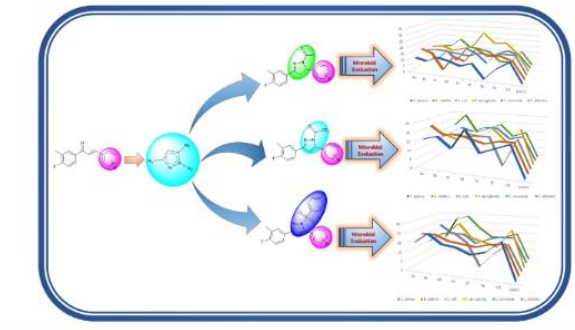
Paper-17	Heterocyclic Letters 15: iss.-4 (2025), 833-846

Ionic liquid / amberlyst-15 catalysts synthesis of 1h-pyrazole derivatives and microbial evaluation

Vilas Vane[1], Ramesh Mokal[1], and Suresh Jadhavar[1]*

[1] *Department of Chemistry, Yogeshwari Mahavidyalaya, Ambajogai, Beed (MH),*
Affiliated to Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra, India.
** Corresponding Author E-mail: sujadhavar@gmail.com*

To explore a conventional eco-friendly approach, we synthesized novel 1H-pyrazole derivatives and conducted biological evaluations of these compounds. We employed a modern method to synthesize 1H-pyrazole derivatives using Amberlyte-15 and the ionic liquid [bmim][PF_6] / $Cu(OTf)_2$ as catalysts from α,β-unsaturated carbonyl compounds. The synthesized 1H-pyrazole derivatives were tested in microbial evaluations, and the results indicated that several of the newly synthesized compounds exhibited potent antimicrobial activity.



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Paper-18 | Heterocyclic Letters 15: iss.-4 (2025), 847-854

Highly proficient and eco-friendly heterogeneous polystyrene divinylbenzene supported sulphanilic acid catalyst for the synthesis of derivatives of xanthene under solvent-free conditions

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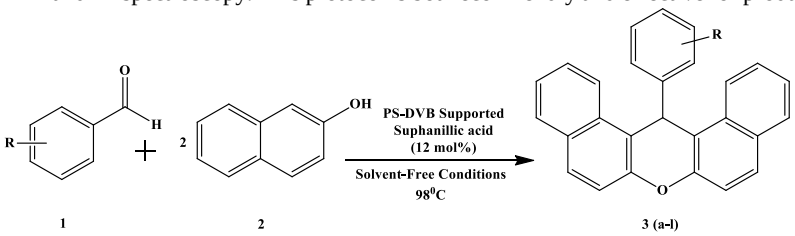
Corresponding Author: nelsynagre@gmail.com

This article presents an efficient and environmentally friendly method for synthesizing xanthene derivatives using sulphanilic acid supported on polystyrene divinylbenzene (PS-DVB) as a catalyst, all conducted under solvent-free conditions. The method boasts several key advantages, including high yields, rapid reaction times, the ability to recycle the catalyst, simple workup procedures, and compatibility with a range of functional groups, making it both economically and ecologically beneficial. The synthesized derivatives were characterized using FT-IR and ^{1}H spectroscopy. This protocol is both eco-friendly and effective for producing xanthene derivatives.



Paper-19 | Heterocyclic Letters 15: iss.-4 (2025), 855-861

Ceric Ammonium Sulfate-Catalyzed Solvent-Free Synthesis of Xanthene Derivatives

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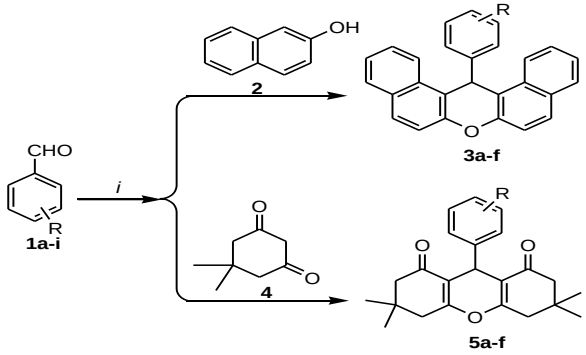
We report an environmentally friendly and highly efficient synthesis of xanthene derivatives under solvent-free conditions, catalyzed by Ceric Ammonium Sulfate (CAS). This facile one-pot, multi-component reaction, carried out at 70-80°C for a remarkably short duration of 10-30 minutes, utilizes aromatic aldehydes and active methylene compounds are dimedone or β-naphthol. The developed methodology provides high to excellent product yields, an inexpensive and readily available catalyst. Its operational simplicity, rapid reaction times, and mild conditions offer a valuable and practical alternative in organic synthesis.



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Paper-20	Heterocyclic Letters 15: iss.-4 (2025), 863-868

Studies on Synthesis, characterization and biological evaluation of 2-(4-Substituted-3-methoxybenzyl)-5,6-dimethoxy-2,3-dihydr 1*H*-inden-1-one derivatives

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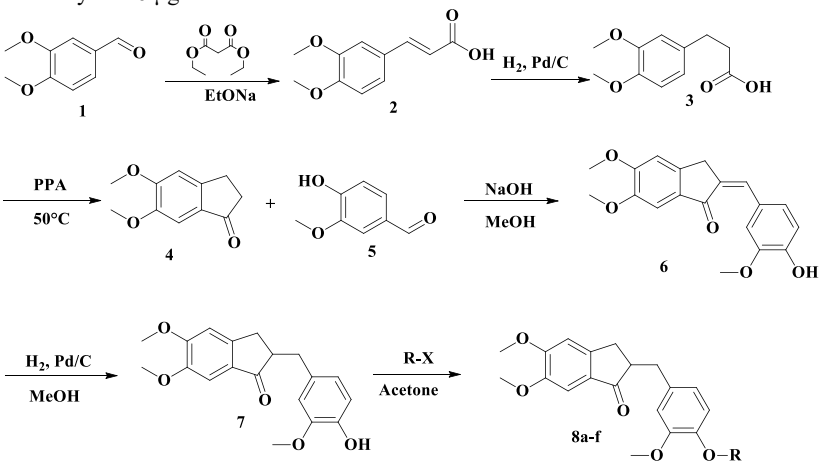
A novel series of 2-(4-Substituted-3-methoxybenzyl)-5,6-dimethoxy-2,3-dihydro-1*H*-inden-1-one derivatives have been synthesized, characterized by using spectral data and screened for anti-tuberculosis activity. The anti-tubercular activity of the synthesized compounds (6a-l) was determined by microplate alamar blue assay and the outcomes were screened *in vitro* against *Mycobacterium tuberculosis* H37Rv strain. Compounds 6a-l exhibited good to potent anti-tubercular activity when compared with the standard first line anti- tuberculosis drugs (ciprofloxacin, pyrazinamide and streptomycin). Some of the tested compounds exhibited highest inhibitory activity at 1.6 µg/mL minimal inhibition concentration.



Paper-21	Heterocyclic Letters 15: iss.-4 (2025), 869-878

Synthesis, charracterization and biological investigations of schiff base ligands.

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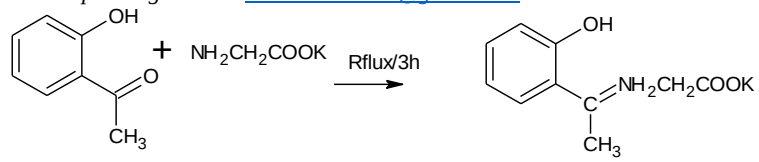

2-Hydroxy-5-methylacetophenone glycine (HMAGLY)

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Paper-22 | Heterocyclic Letters 15: iss.-4 (2025), 879-885

Synthesis and characterization of zinc oxide nanoparticles in a sol-gel environment and its antimicrobial activity

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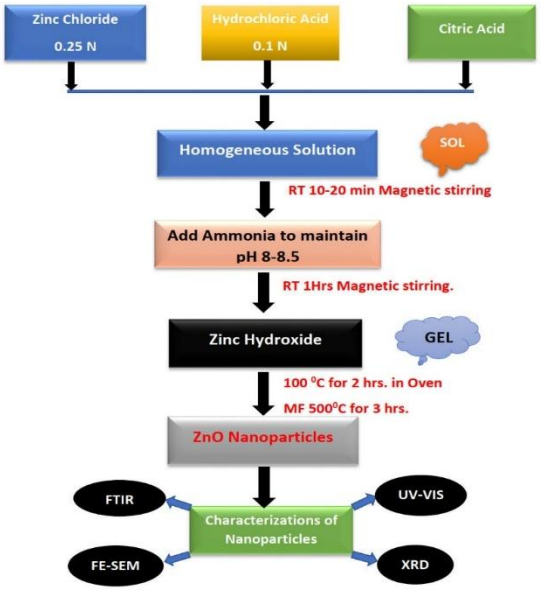
Zinc oxide and related materials have recently received a lot of attention. Zinc oxides have catalytic and electrical properties that can be applied to chemical synthesis, petroleum refining, recording medium, and sensors. They are also used in optical devices, and they are potential photoelectrochemical energy producers with large surface areas and great photo efficiency. We picked sol-gel because some of the previous techniques used high temperatures and harmful chemicals. The sol-gel method is the most sophisticated and environmentally friendly since it does not require high pressure or temperature, is low in cost, can monitor the crystalline size and structure of the nanomaterial by adjusting the medium pH, and can generate a big sample at once. Thus, in this paper, we offer a sol-gel approach for producing zinc oxide nanoparticles using citric acid as a surfactant. ZnO nanoparticles are floating in broth to assess their antibacterial, antifungal, and antimalarial properties.



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REVIEWS

Review No.1	Heterocyclic Letters 15: iss.-4 (2025), 887-909

Chalcones: an insight into their anticancer potential and action mechanism

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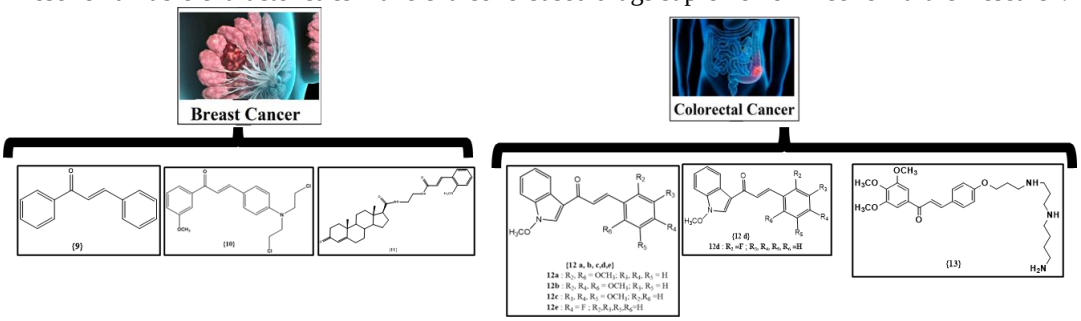
Chalcones and their heterocyclic analogues have a great deal of anticancer potential and have shown a remarkable capacity to selectively stop the growth of cancerous cells. Their therapeutic value is highlighted by their ability to inhibit important protein kinases, cause intrinsic apoptosis, and interrupt cell-cycle progression. These remarkable characteristics make chalcone-based drugs supreme nominee for further research.



Review No.2	Heterocyclic Letters 15: iss.-4 (2025), 911-925

A Review of Research on Recent Applications of Schiff's Bases

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A broad class of organic compounds known as Schiff bases (SBs) are distinguished by the presence of carbon–nitrogen double bonds (–C=N–). They are generated by condensation processes, usually with the aid of solvents like methanol, between primary amines and aldehydes or ketones. The numerous biological actions of these substances, including their antibacterial, antifungal, antiviral, anti-inflammatory, and antioxidant qualities, have attracted a lot of research. Schiff bases are produced when primary amines react with aldehydes or ketones. They have antioxidants, antiviral, antibacterial, antifungal, and anti-inflammatory properties. In coordination chemistry, Schiff bases play a crucial role by creating stable metal complexes with different metal ions. Pharmaceuticals, agrochemicals, dyes, analytical chemistry, catalysis, energy storage, environmental applications, chemo-sensing, bio-sensing, and biomedical applications are just a few of the sectors that use Schiff bases. Because Schiff bases may form stable complexes with metal ions, they are essential for both organic and inorganic chemistry. Schiff bases with possible antiviral, antifungal, and antibacterial effects have been the subject of recent research. To improve knowledge of their synthesis procedures, synthetic schemes are developed.