Heterocyclic Letters
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Graphical Abstract

Paper-1	Heterocyclic Letters 11: iss.-3 (2021), 319-322

Banik's Aromatic Nitration

Bimal Krishna Banik* and Ram N. Yadav[2]

[1]Department of Mathematics and Natural Sciences, College of Sciences and Human Studies, Deanship of Research Development, Prince Mohammad Bin Fahd University, Al Khobar 31952, Kingdom of Saudi Arabia; [2]Department of Chemistry, Faculty of Engineering & Technology, Veer Bahadur Singh Purvanchal University, Jaunpur-222003, (U.P) INDIA
Email: Email:bimalbanik10@gmail.com,bbanik@pmu.edu.sa
#Dedicated to the Dr. R. R. Gupta on the Occasion on his 80th Birthday

Banik's aromatic nitration with bismuth nitrate is performed on diverse aromatic compounds.

Paper-2	Heterocyclic Letters 11: iss.-3 (2021), 323-327

Banik's cycloaddition reaction: anticancer β-lactams

Bimal Krishna Banik*[1], Indrani Banik[2] and Ram N. Yadav[3]

[1]Department of Mathematics and Natural Sciences, College of Sciences and Human Studies, Deanship of Research Development, Prince Mohammad Bin Fahd University, Al Khobar 31952, Kingdom of Saudi Arabia; [2]The University of Texas, M. D. Anderson Cancer Center, Houston, Texas, USA; [3]Ram N Yadav, Department of Chemistry, Faculty of Engineering & Technology, Veer Bahadur Singh Purvanchal University, Jaunpur-222003 (U.P.) INDIA
Email: bimalbanik10@gmail.com; bbanik@pmu.edu.sa
#Dedicated to the Dr. R. R. Gupta on the Occasion on his 80th Birthday

Bimal Krishna Banik has discovered a new reaction (Banik's Cycloaddition Reaction) of polyaromatic Schiff base with an acid chloride in the presence of an organic tertiary base to afford novel beta-lactams. This cycloaddition reaction is highly diastereoselective. The most probable mechanism of this reaction is advanced. Some of the resulting beta-lactams have demonstrated selective anticancer activities against several human cancer cell lines.

Paper-3	Heterocyclic Letters 11: iss.-3 (2021), 329-334

Banik's Glycosylation Reaction

Bimal Krishna Banik*[1] and Ram N. Yadav[2]

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Banik has discovered a new method of glycosylation of diverse hydroxy beta lactams.

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Paper-4	Heterocyclic Letters 11: iss.-3 (2021), 335-338

Banik's Oxidation Reaction by Sodium Bismuthate

Bimal Krishna Banik*[1] and Ram Naresh Yadav[2]

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#Dedicated to Dr. R. R. Gupta on Occasion on his 80[h] Birthday.

Banik's oxidation reaction of benzylic methylenes to benzylic ketones and acetates is performed with sodium bismuthate in acetic acid.

Paper-5	Heterocyclic Letters 11: iss.-3 (2021), 339-347

New easy one-pot synthetic routes for 2-arylbenzimidazoles

Ahmad Q. Hussein[a,*] and Mervat M. Sammor[b]

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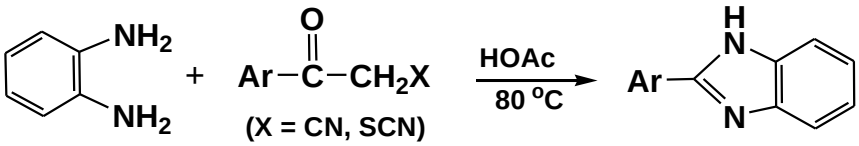
[b] Al-Balqa' Applied University, Zarqa, Jordan
[*]Corresponding author Email: aghussein@ju.edu.jo

Condensation of 1,2-phenylenediamine with either phenacyl cyanides, phenacyl thiocyanates, or benzylidenemalononitriles affords the corresponding 2-arylbenzimidazoles.



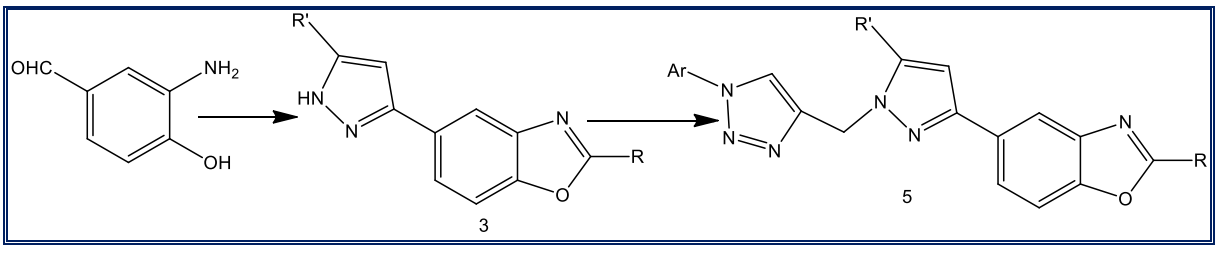
Paper-6	Heterocyclic Letters 11: iss.-3 (2021), 349-357

Synthesis, Antibacterial and Anti bio-film activity of some new 1,2,3 Triazoles on Benzoxazole nucleus

Mood Shilpa[a], Guguloth. Hanmanthu[a]*

**[a]Department of Chemistry, Kakatiya University, Warangal-506009.Telangana, India*
Email:hanmanthu.guguloth@yahoo.com

A series of benzoxazole fused 1,2,3 triazoles were synthesised by click chemistry method, The structures of the synthesised compounds were assessed by Infra red, NMR and Mass spectroscopic methods. The title compounds were evaluated by antibacterial using Zone of inhibition, MIC method and antibiofilm activity, some of the molecules shown excellent activity and remaining compounds were also exhibit moderate activity against the test organism employed.



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Paper-7 | Heterocyclic Letters 11: iss.-3 (2021), 359-370

Synthesis, antioxidant activity of 2-ferrocenylaniline and bis-2 ferrocenylaniline and some binding parameters towards superoxide anion radical

Soulef Benabdesselam[1], Oumelkheir Rahim[2*]

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[2] Pollution & Waste Treatment Laboratory, Chemistry Department, Faculty of mathematics and Matter sciences, University Kasdi Merbah, Ouargla 30000, Algeria.

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

Synthesis of 2-ferrocenylaniline (2-FA) and Bis- 2- ferrocenylaniline (bis-2-FA)

In this work, 2-ferrocenylaniline and bis-2-ferrocenylaniline were synthesized through the arylation of ferrocene by diazotasing of 2-nitroaniline.

Antioxidant activity

Total antioxidant capacity of 2-FA and bis-2-FA expressed as ascorbic acid equivalents (mg AAE/ml).

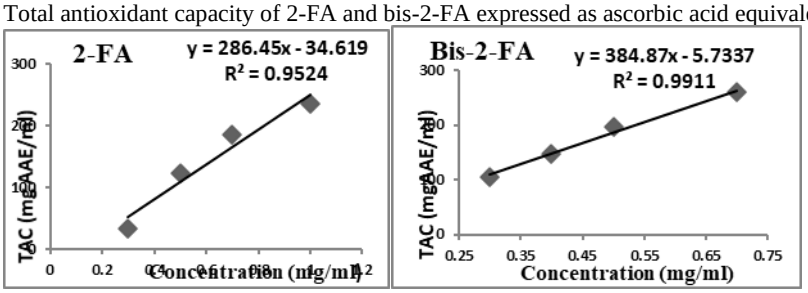


Figure (1): TAC of 2-FA and bis-2-FA expressed as Equivalent Ascorbic acid

2. Superoxide scavenging test

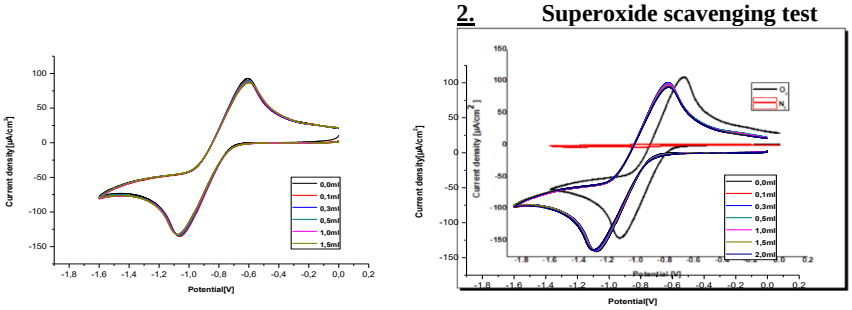


Figure (2): Cyclic voltammograms of $O_2^{\cdot -}$ in the presence of different concentration of 2-FA and bis-2-FA in DMF + 0.02 M Bu_4NBF_4 on GC as working electrode vs SCE at 28°C with scan rate of 0.1 V/s

Binding constant (K_b) and Antioxidant Activity coefficient (K_a)

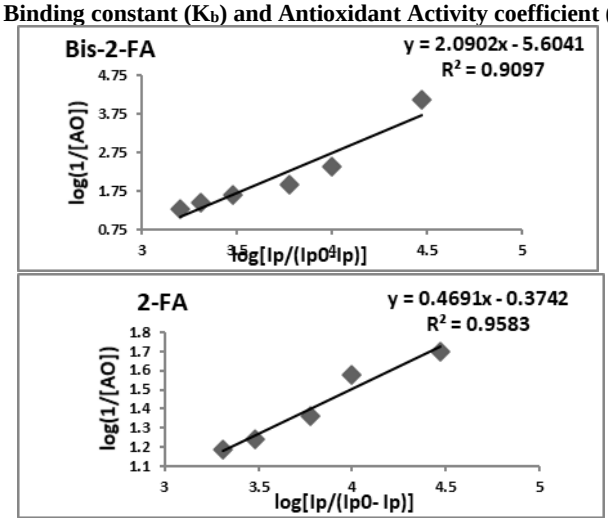
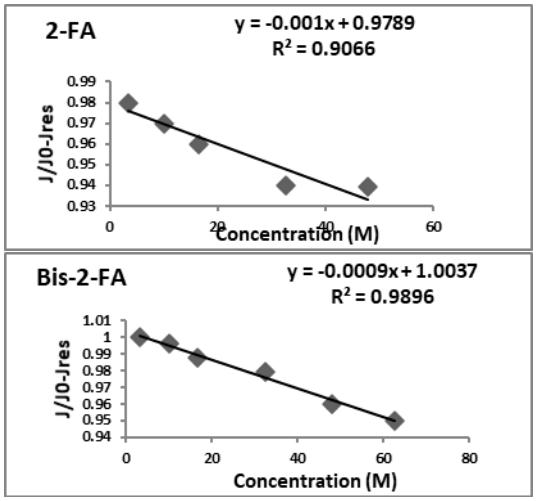


Figure (5): Plots to determine binding constant (k_b) using equation log (1/[AO]) vs log [Ip/(Ipo – Ip)] for 2-FA and bis-2-FA.



Relative change of the $O_2^{\bullet -}$ current density vs. change in sample concentration for anodic peak of 2-FA and bis-2-FA.

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Paper-8	Heterocyclic Letters 11: iss.-3 (2021), 371-377

Synthesis and anti-inflammatory activity of novel 1,3,4-oxadiazole derivatives

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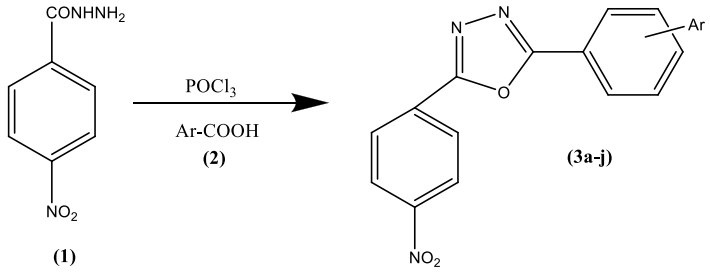
Email: revan@nitte.edu.in

A new series of novel 1,3,4-oxadiazoles**(3a-j)** were synthesized by reacting 4-nitro benzhydrazide**(1)** and substituted aromatic acids**(2)** in presence of phosphorus oxychloride. The title compounds were characterized by spectral data (IR, NMR, Mass). In-vitro Anti-inflammatory activity of all the newly synthesized compounds were evaluated by denaturation assay, anti-proteinase method, HRBC assay and Diclofenac sodium was used as standard drug. Some of the tested compounds showed good ant-inflammatory activity by denaturation assay.



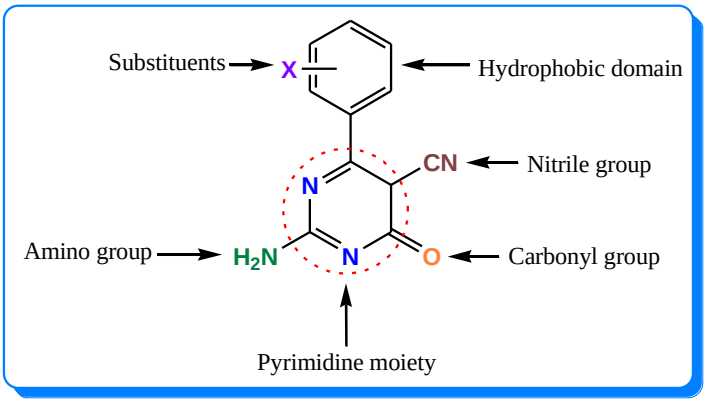
Paper-9	Heterocyclic Letters 11: iss.-3 (2021), 379-386

Multicomponent One-pot Facile Synthesis of Pyrimidine Derivatives under Microwave Irradiation Technique and Study of Their Anti-inflammatory Activity

Krishna Chandra Panda*, B.V.V Ravi Kumar, Biswa Mohan Sahoo

Roland Institute of Pharmaceutical Sciences, Berhampur-760010 affiliated to Biju Patnaik University of Technology (BPUT), Rourkela, Odisha, India

Multicomponent one-pot synthetic protocol is applied for the efficient preparation of a series of pyrimidine derivative under microwave irradiation method.



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Paper-10 | Heterocyclic Letters 11: iss.-3 (2021), 387-392

Ionic liquid mediated one pot synthesis of 2,4,5-tri aryl imidazoles from 1,3-diaryl pyarazole carbaldehydes under solvent-free condition

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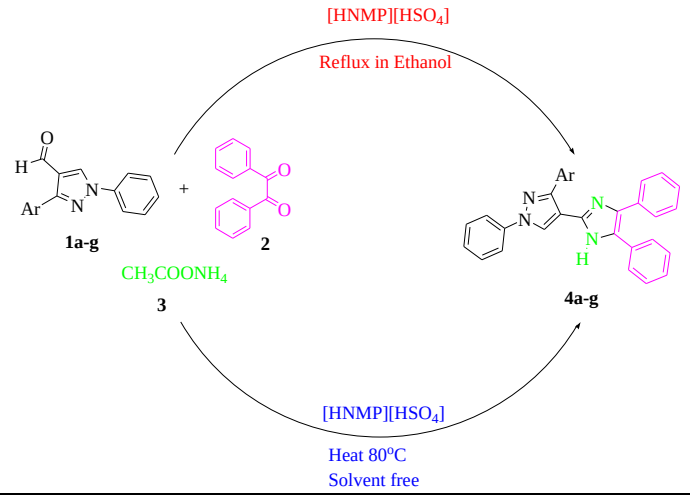
A facile protocol has been established for the one-pot synthesis of 2,4,5-trisubstituted imidazoles derivatives via three-component condensation of 1,3-diaryl pyrazole aldehydes, benzil and ammonium acetate in the presence of catalytic amount of a ionic liquid [HNMP][HSO_4] as an catalyst under solvent-free condition. The significant features of this protocol include high-atom economy, smooth work-up procedure, inexpensive catalyst, easy for handling, shorter reaction time, high yield, multi-component approach and solvent-free reaction.



Paper-11 | Heterocyclic Letters 11: iss.-3 (2021), 393-401

Triphenylphosphine: as a proficient catalyst for one pot synthesis of α-hydroxy phosphonates under neat condition

Kabeer A. Shaikh[a] and Yogesh B. Salve[b*]

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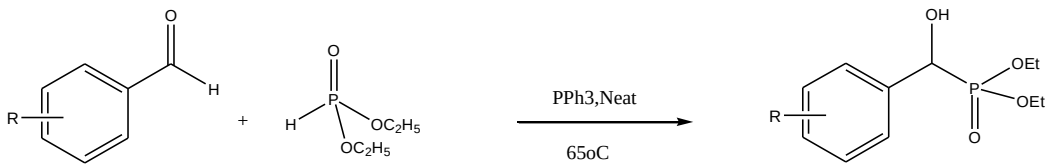
*[*b]Department of Chemistry, Arts, Commerce and Science College Sonai, Tal-Newasa, Dist-Ahmednagar-414105 [M.S.] India.*
corresponding author email: yogesh88.salve@gmail.com

One pot synthesis of α-hydroxy phosphonates using aromatic aldehyde and diethyl phosphite catalysed by triphenylphosphine (PPh_3) in under solvent less condition. The reaction proceeds with short reaction time, eco-friendly catalyst, easy work-up procedure, high yielding of products.



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Paper-12 | Heterocyclic Letters 11: iss.-3 (2021), 403-408

Novel synthesis and characterization of (E)-1-((4-(4-substituted phenyl)-1,2,3-thiadiazol-5-yl) methyl)-N-nitro imidazolidin-2-imine derivatives

Anil Chidrawar

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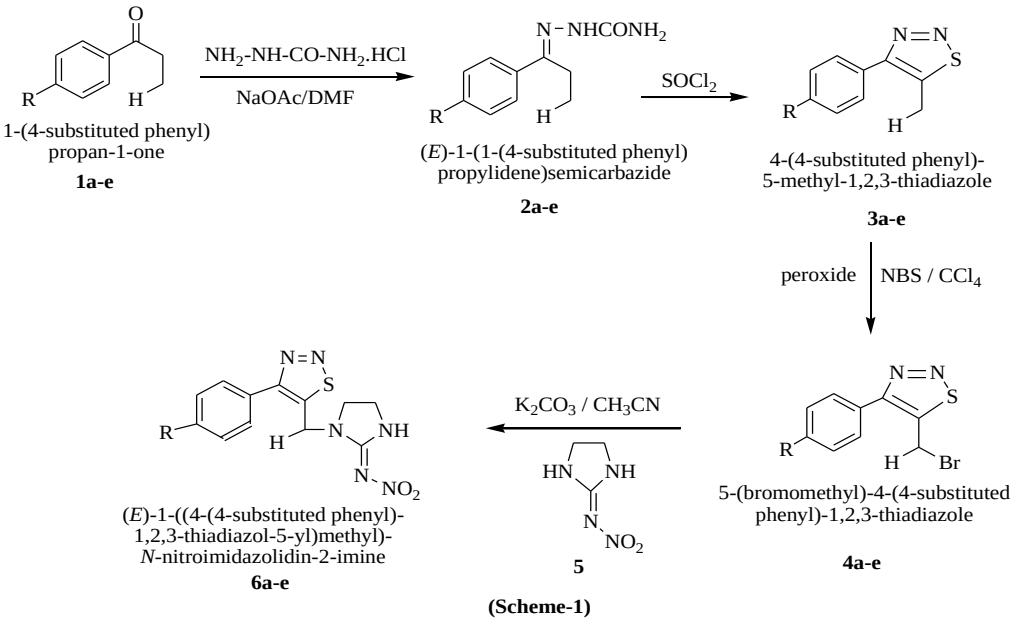
Synthesis of 1,2,3-thiadazolyl imidazole derivatives as neo nicotinic insecticides. Synthesis of this by reacting 1-(4-substituted phenyl) propan-1-one (1a-e) with semi carbazide hydrochloride in sod. acetate and DMF gives (E)-1-(1-(4-substituted phenyl) propylidene) semi carbazide (2a-e). This semi carbazide cyclized with thionyl chloride to obtained 4-(4-substituted phenyl)-5-methyl-1,2,3-thiadiazole (3a-e). Which on further reacted with peroxide, NBs and CCl_4 gives 5-(bromomethyl)-4-(4-substituted phenyl)-1,2,3-thiadiazole (4a-e). This product again reacted with N-nitroimidazolidin-2-imine (5), K_2CO_3 and CH_3CN gives (E)-1-((4-(4-substituted phenyl)-1,2,3-thiadiazol-5-yl)methyl)-N-nitroimidazolidin-2-imine (6a-e). The sequence of synthetic methodology is depicted in Scheme 1.

Scheme-1



(Scheme-1)

R = H, -Cl, -Br, -F, -OMe

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Paper-13 | Heterocyclic Letters 11: iss.-3 (2021), 409-416

Investigation of the reaction of 3-[2-oxo-2-(2-thienyl)ethylidene] indol-2(1*H*)-ones with 2-hydrazinobenzimidazole and evaluation of insecticidal activity

Kanti Sharma* and Lokesh Kumar Sharma

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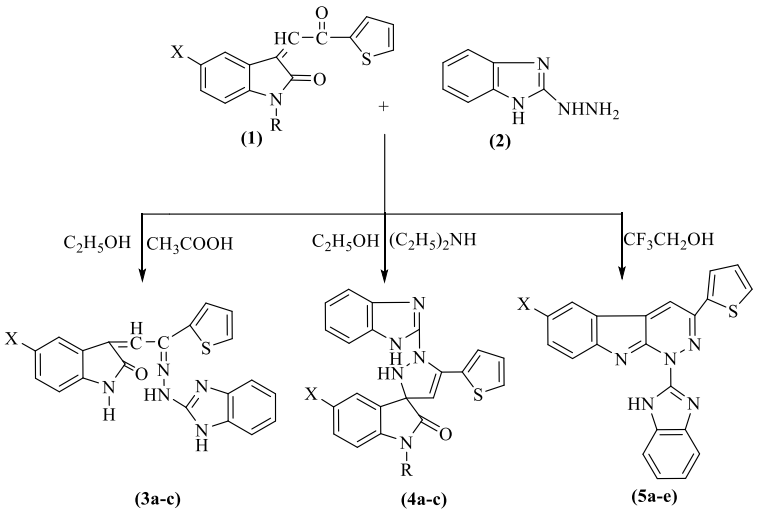
E-mail :drkanti@gmail.com

The reaction of 3-[2-oxo-2-(2-thienyl)ethylidene]indol-2(1*H*)-one (**1**)with 2-hydrazinobenzimidazole (**2**) in different media and solvent have been investigated. The structure of synthesized compounds were characterized by spectral (IR, ^{1}H-NMR, ^{13}C- NMR, Mass) and analytical data. Synthesized compounds were evaluated for insecticidal activity against *Periplanata americana* using Cypermethrin as standard and found to exhibit excellent results.



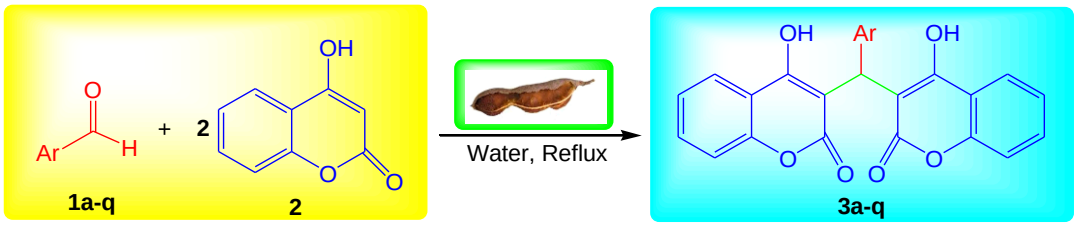
Paper-14 | Heterocyclic Letters 11: iss.-3 (2021), 417-423

Tamarind juice catalyzed green and efficient synthesis of biscoumarin derivatives in aqueous media

Amit S. Waghmare

Department of Chemistry, Arts, Commerce and Science College, Satral, Ahmednagar (MS) Pin-413711 India
(Affiliated to Savitribai Phule Pune University, Pune)
E-mail:asw6807@gmail.com

A green and efficient synthesis of biscoumarin derivatives is achieved in aqueous media catalyzed by tamarind juice as a natural catalyst. This Knoevenageal condensation is achieved using 4-hydroxycoumarin and different aromatic aldehyde in aqueous media at reflux condition.



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Paper-15	Heterocyclic Letters 11: iss.-3 (2021), 425-430

Highly efficient and solvent free transformation of glycerol over a heterogeneous solid acid catalyst

Krishnaveni .M[a], and Chellapandian Kannan[A] *

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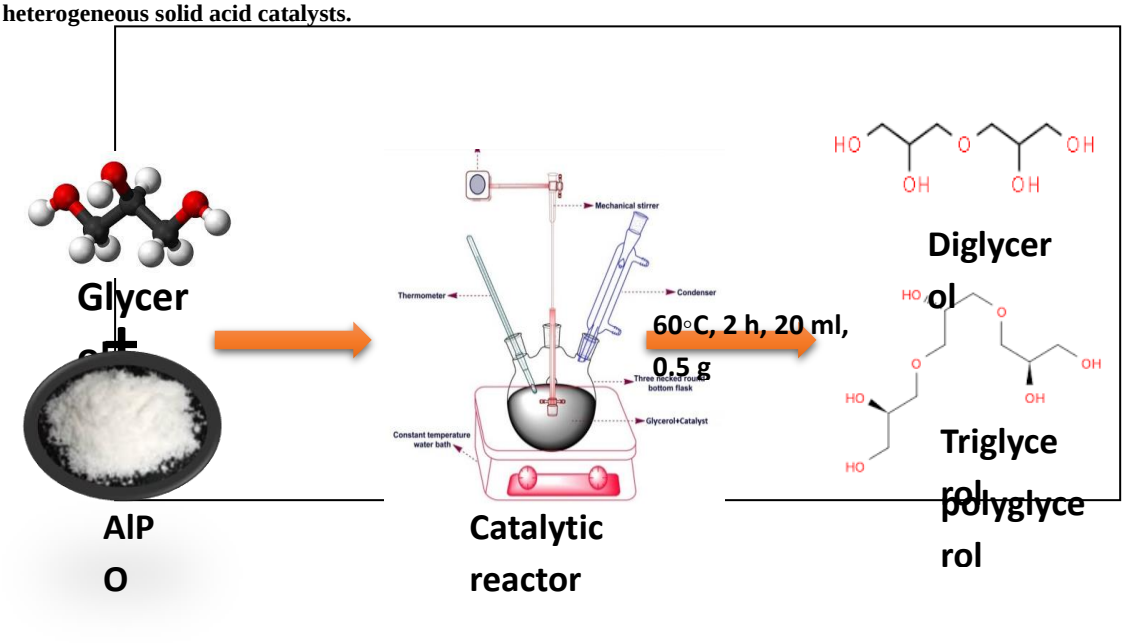
**Email: chellapandiankannan@gmail.com*

The highly efficient and selective transformations of glycerol to valuable compounds are investigated using reusable heterogeneous solid acid catalysts.

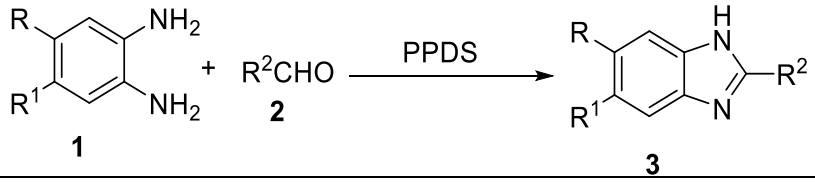


Paper-16	Heterocyclic Letters 11: iss.-3 (2021), 431-446

A facile synthesis of diverse libraries of benzimidazole, benzoxazole, benzothiazole and quinazolin-4(3H)-one via PPDS-$CuSO_4$ mediated reactions of aldehydes in aqueous micelles

Siyaram Prasad*[1], Nausheen Amber[2], Pratyoosh Kumar[2]

Department of Chemistry, Millat College, Lalit Narayan Mithila University, Darbhanga, Bihar.
Email: siyaramprasad022@gmail.com



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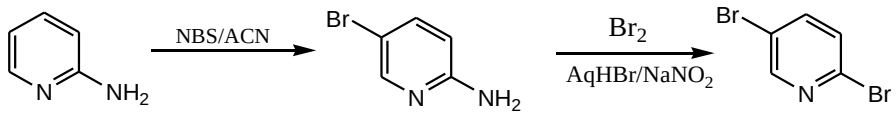
Paper-17 | Heterocyclic Letters 11: iss.-3 (2021), 447-452

An Improved, Practical, Reliable and Scalable Synthesis of 2,5-dibromopyridine

Sachin Sonavane *, Ganesh Deshmukh, Satish Wakchaure & Sharayu Deshmukh

Research & Development Centre, Delta Finochem Pvt. Ltd. Gat No. 350, Wadivarhe, Nashik-422 403, Maharashtra, India
**Corresponding author Email: sachin.sonavane@gmail.com*

A convenient and scalable process for preparation of 2,5-dibromopyridine has been developed. Total yield of 83% has been achieved from 2- aminopyridine. The process is convenient and could be easily scaled up. Modified Sandmeyer conditions applied to synthesize 2,5-dibromopyridine.



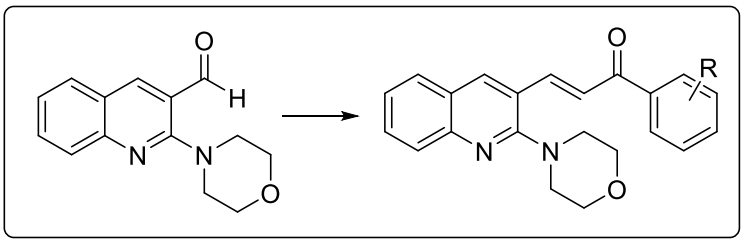
Paper-18 | Heterocyclic Letters 11: iss.-3 (2021), 453-456

Ultrasound mediated synthesis, antibacterial activity of morpholinyl-quinoline based chalcone derivatives

GUGULOTH RAVI* [1] , K.BHASKAR 2 , SRINIVAS GALI [2] , BAVU RAJKUMAR [2]

**[1] UGC-POST DOCTORAL FELLOW, DEPARTMENT OF CHEMISTRY, OSMANIA UNIVERSITY, HYDERABAD-007, TELANGANA, INDIA.*
[2] DEPARTMENT OF CHEMISTRY, SRR GOVERNMENT ARTS AND SCIENCE COLLEGE, KARIMNAGAR-001, TELANGANA, INDIA.

A series morpholinyl-quinoline based chalcone derivatives were prepared by the condensation of morpholine-substituted-quinoline aldehyde with various acetophenones using piperidine as base in ultrasound irradiation. The compounds were characterized by using ^{1}H NMR, ^{13}C NMR and mass spectrometry.



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Paper-19	Heterocyclic Letters 11: iss.-3 (2021), 457-462

Constitution of Flavone Pitgularin - C

Rekha Kashyap[1] , Euis Nurul Hidaya[2], Pramod Kumar Meena[3], Ram Babu Pachwarya[1]*

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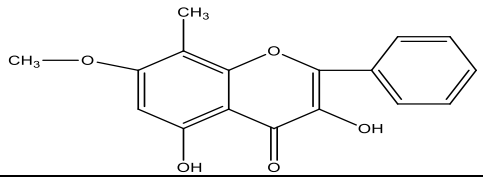
2. *Department of Environmental Engineering, University of Pembangunan Nasional Veteran Jawa Timur, Surabaya, Indonesia*
3. *Department of Chemistry, Government Bangur College Didwana (Nagaur) Rajasthan, India - 341303*
**Corresponding Author: Department of Chemistry, Motilal Nehru College, Delhi University, India*
Email Address: applicationrbp@gmail.com

Constitution of a new flavone Pitgularin - C isolated from Pityrograma triangularis has been confirmed by its synthesis as 3,5-dihydroxy -7 –methoxy - 8 methyl flavone by two methods: First method utilised 2 ′-hydroxy – 3 ′-methyl -4 ′, 6 ′-dimethoxychalcone as an essential intermediate. AFO oxidation of this chalcone gave 3-hydroxy-5 ,7-dimethoxy-8-methylflavone which on selective demethylation formed 3 ,5 –dihyroxy-7-methoxy-8-methylflavone . Second method utilised Allan Robinson condensation of 2 –hydroxy- ω ,4,6-trimethoxy -3-methylacetophenone , Benzoic anhydride and sodium benzoate to get 3,5,7-trimethoxy-8-methylflavone which on demethylation followed by selective methylation gave 3 ,5 –dihyroxy-7-methoxy-8-methylflavone .



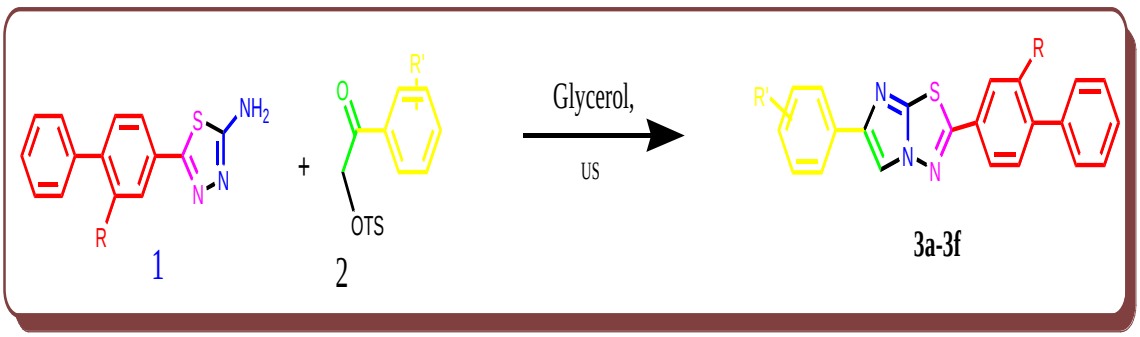
Paper-20	Heterocyclic Letters 11: iss.-3 (2021), 463-466

Ultrasound promoted synthesis of biphenylimidazo[2,1b][1,3,4]thiadiazole in Glycerol-water

Tukaram S. Choudhare[a], Devendra S. Wagare[b], Sangita P. Pawar[c], Prashant D. Netankar [a] *

[b]Department of chemistry, Vivekanand College, Aurangabad 431001(M.S.), India
**[2]Department of chemistry, Maulana Azad college, Aurangabad 431001(M.S.), India*
Email address of corresponding author: pdnchemi@gmail.com

Biphenylimidazo[2,1-b][1,3,4]thiadiazoles derivatives synthesized by condensation of α-tosyloxyketones and 5-(Biphenyl-4-yl)-1,3,4-thiadiazol-2-amine under ultrasound in glycerol and water as environmentally benign medium. Use of ultra sound, Green medium, metal free catalyst free and high percentage yield are the main remarkable feature of this protocol.



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Paper-21 | Heterocyclic Letters 11: iss.-3 (2021), 467-476

Design, Synthesis and Characterization of Some Novel Thiazole and Quinoline Containing Schiff Base and Evaluation of Their *In-Vitro* Anti-Inflammatory and Antimicrobial Activity

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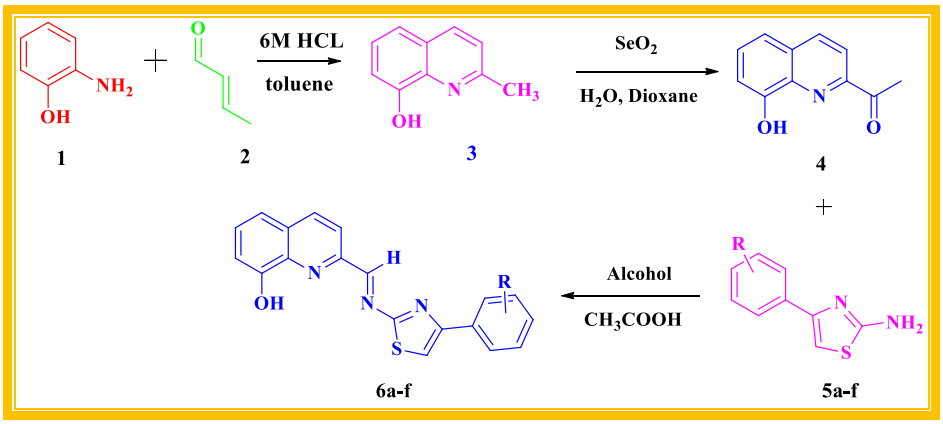
A novel and eco-friendly series of quinoline Schiff Base i.e.(E)-2-(((4-substitutedthiazol-2-yl) imino)methyl)quinolin-8-ol **6(a-f)** were synthesized in PGE-400 with excellent yield. It containing two pharmacological active nucleus i.e. 8-hydroxy quinoline and 4-substituted phenylthiazole, which possesses promising to moderately *In-vitro* anti-inflammatory, antibacterial and antifungal activities.



Paper-22 | Heterocyclic Letters 11: iss.-3 (2021), 477-484

A one pot multi-component synthesis of polyhydroquinoline derivatives using montmorillonite k10 as solid acid catalyst

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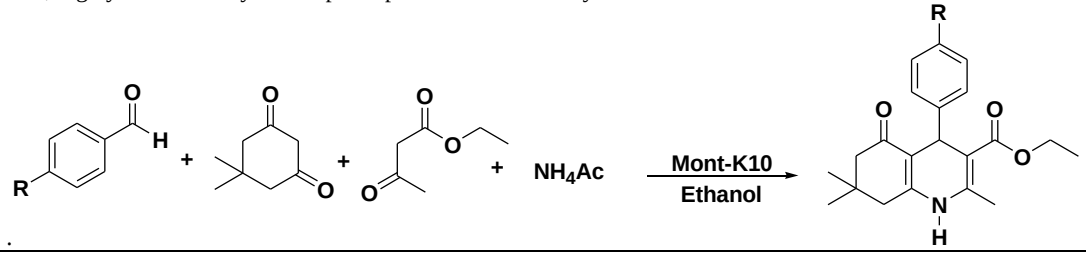
A simple, facile and efficient procedure for the synthesis of polyhydroquinolines via one pot four component condensation of different aromatic aldehyde with dimedone, ethylacetoacetate and ammonium acetate using montmorillonite K10 as solid acid catalyst has been developed. The new synthesis technique offers numerous advantages of safety, mild conditions, simplicity, short reaction time, high yields and easy work up compared to traditional synthesis method.



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Paper-23	Heterocyclic Letters 11: iss.-3 (2021), 485-490

Synthesis and anti-inflammatory activity of novel arylazo pyrazole derivatives

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A new series of 3,5-Dimethyl arylazo pyrazole derivatives **(3a-h)** were synthesized by the condensation of oxobutyrates **(2a-h)** (obtained by the reaction of 1,3-diketone with diazonium salts in the presence of sodium acetate in alcohol medium) with 2,4-dinitrophenyl hydrazine **(1)** in glacial acetic acid medium. All the newly synthesized compounds were assigned by ^{1}H-NMR, IR, Mass spectral data. The new compounds were evaluated for their In-*Vitro* anti-inflammatory activity by bovine serum albumin and egg albumin methods using diclofenac sodium as standard. Some of the tested compounds showed good anti-inflammatory activity.