
Dr. KISHOR MOHANAN

Principal Scientist

CSIR-Central Drug Research Institute

Lucknow, India

E-mail: kishor.mohanan@cdri.res.in or
mohanankishor@gmail.com

Telephone No. +915222772450 (O); +918005493219 (M)

Homepage: <https://www.kishorlab.net/>

<http://www.cdri.res.in/1827.aspx?id=1827>

EDUCATION

- Ph. D., Organic Chemistry, University of Kerala, India, January 2007.
Thesis Title: “*Novel strategies for the synthesis of carbocycles and heterocycles by Cerium (IV) ammonium nitrate (CAN) mediated reactions.*”
Mentor: Dr. G. Vijay Nair, National Institute for Interdisciplinary Science and Technology (NIIST), Formerly RRL (CSIR), India.
- M. Sc., Chemistry with first class, St. Joseph’s College, Moolamattom M.G. University, Kerala, India, April 2001.
- B. Sc., Chemistry with first class, Newman College, Thodupuzha, M.G. University, Kerala, India, April 1999.

PROFESSIONAL EXPERIENCE

- **May 2017-Present, Principal Scientist**
- **May 2013-April 2017, Senior Scientist**
Medicinal and Process Chemistry Division, CSIR-Central Drug Research Institute, Lucknow, India.
- **July 2009-April 2012, Post-doctoral fellow**
Mentor: Prof. Jean Rodriguez, Director, iSm2 at University Paul Cezanne, Marseille, France.
- **July 2008-June 2009, Post-doctoral fellow**
Mentor: Dr. Michael Smietana, University of Montpellier, Montpellier, France.
- **June 2006-June 2008, Post-doctoral fellow**
Mentor: Prof. Biing-Jiun Uang, Department of Chemistry, National Tsing-Hua University, Hsinchu, Taiwan.
- **April 2002-June 2006, Ph. D., Organic Chemistry, University of Kerala, India.**
Mentor: Dr. G. Vijay Nair, National Institute for Interdisciplinary Science and Technology (NIIST), Formerly RRL (CSIR), India.

HONORS AND AWARDS

- CSIR Junior Research Fellowship, India (2002)
- CSIR Senior Research Fellowship, India (2004)
- Fellowship of the National Science Council, Taiwan (2008)
- Welcome Scholarship from the City of Marseille, France (2010)
- DST Fast Track Young Scientist award, India (2014)
- CSIR-CDRI Incentive award for publication (2017)
- CSIR-CDRI Incentive award for publication (2018)
- CSIR-CDRI Incentive award for publication (2020)

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Life member of the Chemical Research Society of India

RESEARCH INTERESTS

In broader terms, our research centers on the development of new strategies for the construction of important fluoroorganic building blocks. In our ongoing quest to create trifluoromethylated compounds, in this area, we aim to understand and harness novel reactivity patterns of trifluorodiazaoethane by a careful and imaginative selection of substrates, conditions, and catalysts for rapid access to trifluoromethylated heterocycles and other important core fragments. Besides the trifluoromethyl group, the development of effective methods for incorporating fluorine into organic compounds has become an emerging theme of research in the last decades. Among the methods used, using α -fluorocarbanions as nucleophiles for various addition reactions constitutes an efficient alternative approach to producing fluoroorganic building blocks. Our research in this area centers on discovering novel, robust, and metal-free conditions for introducing vital fluorocarbon subunits into arenes. In addition, our research focuses on developing small molecule therapeutics for disease areas such as cancer and malaria.

RESEARCH GROUP

Students	Completed	Ongoing
PhD	7	8
MPharm	6	0
MSc	28	0

PUBLICATIONS

Research Publications:	53
Reviews:	03
Book chapters	01
Citations:	1266
h-index:	20

RESEARCH PUBLICATIONS

53. Reagent- and solvent-controlled product divergence in the reaction of trifluorodiazaoethane with arylidene-1,3-indanediones. Ahmad, M.; Fatma, L.; Kant, R.; Mohanan, K. *J. Fluor. Chem.* **2024**, *274*, 110256.
52. CsF-Mediated Reaction of Trifluorodiazaoethane with 3-Nitroindoles Enables Access to Trifluoromethylpyrazolo[4,3-b]indoles. Kumar, S.; Fatma, L.; Vaishanv, N. K.; Mohanan, K. *J. Org. Chem.* **2024**, *89*, 761.
51. Trapping of Arynes with In Situ Generated Aryltrifluoromethylnitrones Enables Access to Trifluoromethylated Benzoxazolines. Jamali, M. F.; Ahmad, M.; Chandrasekharan, S. P.; Mohanan, K. *Org. Lett.* **2023**, *25*, 7551.
50. Metal-free Reaction of Allenamides with in situ Formed Trifluoromethylnitrones as a Route to Highly Functionalized Isoxazolidines. Yadav, U.; Chandrasekharan, S. P.; Nair, P. P.; Harikumar, S.; Mohanan, K. *Asian J. Org. Chem.* **2023**, *12*, e202300342.
51. Ag-Catalyzed Annulation of o-Alkynylaryl Aldehydes, Amines, and Diazo Compounds: Construction of Trifluoromethyl- and Cyano-Functionalized Benzo[d]azepines. Chandrasekharan, S. P.; Dhimi, A.; Mohanan, K. *Org. Lett.* **2023**, *25*, 5806.
This work has been highlighted in *Synfacts* **2023**, 1005.
48. Efficient α -Arylation of α -Fluoro- α -nitrosulfonylmethanes Employing Diaryliodonium Salts. Zaheer, M. K.; Vaishanv, N. K.; Kumar, A.; Kant R.; Mohanan, K. *Synthesis* **2023**, *55*, 3382.
47. A Direct Silver-Catalyzed Three-Component Approach to Trifluoromethylated Cyanopyrazoles and Cyanopyrazolines. Kumar, A.; Mathew, S.; Jamali, M. F.; Ahamad, S.; Kant, R.; Mohanan, K. *Adv. Synth. Catal.* **2023**, *365*, 2218.
46. Direct Access to Trifluoromethylated Benzo[d]oxepines from o-Alkynylaryl Aldehydes and Trifluorodiazaoethane. Dhimi, A.; Chandrasekharan, S. P.; Mohanan, K. *Org. Lett.* **2023**, *25*, 3018.
This work has been highlighted in *Synfacts* **2023**, 0676.
45. Incorporation of Trifluoromethyltriazoline in the Side Chain of 4-Aminoquinolines: Synthesis and Evaluation as Antiplasmodial Agents. Yadav, K.; Sharma, A.; Shaham, S. H.; Chandrasekharan, S. P.; Kumar, S.; Dhimi, A.; Nasreen, H.; Mohanan, K.; Tripathi, R. *ChemMedChem*, **2023**, *18*, e202200653.
44. Additive-free synthesis of fused tricyclic cyanoisoxazolidines using in situ formed cyanonitrones. Jamali, M. F.; Yadav, U.; Babu, M. M. M.; Kant, R.; Mohanan, K. *Chem. Commun.* **2023**, *59*, 446.
43. Substrate-controlled product divergence in the reaction of α -fluoro- β -ketoamides with arynes. Chandrasekharan, S. P.; Vaishanv, N. K.; Kant, R.; Mohanan, K. *Chem. Commun.* **2022**, *58*, 12987.
42. Efficient Construction of 3-Fluoroalkylated Oxindoles Enabled by Zwitterion Catalysis. Kumar, S.; Vaishanv, N. K.; Mohanan, K. *Asian J. Org. Chem.* **2022**, *11*, e202200084.

41. Organocatalytic Asymmetric Nitroso Aldol Reaction of α -substituted malonamates. Gupta, E.; Vaishanv, N. K.; Kumar, S.; Purushottam, R. K.; Kant, R.; Mohanan, K. *Beilstein. J. Org. Chem.* **2022**, *18*, 227.
40. Silver-Catalyzed Direct Synthesis of Trifluoromethylated Enaminopyridines and Isoquinolinones Employing Trifluorodiazaoethane. Kumar, A.; Dhama, A.; Kant R.; Mohanan, K. *Org. Lett.* **2021**, *23*, 5815.
39. Additive-Free Synthesis of Trifluoromethylated Spiro Cyclopropanes and Their Transformation into Trifluoromethylated Building Blocks. Kumar, A.; Jamali, M. F.; Thomas, S.; Ahamad, S.; Kant R.; Mohanan, K. *Asian J. Org. Chem.* **2021**, *10*, 1536.
38. Base-Mediated Intramolecular Cyclization of α -Nitroethylallenic Esters as a Synthetic Route to 5-Hydroxy-3-pyrrolin-2-ones. Vaishanv, N. K.; Zaheer, M. K.; Kumar, S.; Kant R.; Mohanan, K. *J. Org. Chem.* **2021**, *86*, 5630.
37. Utilization of Unsymmetric Diaryliodonium Salts in α -Arylation of α -Fluoroacetoacetamides. Zaheer, M. K.; Vaishanv, N. K.; Kant R.; Mohanan, K. *Chem. Asian. J.* **2020**, *9*, 4297.
36. The Bestmann-Ohira Reagent and Related Diazo Compounds for the Synthesis of Azaheterocycles. Jamali, M. F.; Vaishanv, N. K.; Mohanan, K. *Chem. Rec.* **2020**, *20*, 1394.
35. Substrate-controlled, PBu₃-catalyzed annulation of phenacylmalononitriles with allenates enables tunable access to cyclopentenes. Vaishanv, N. K.; Chandrasekharan, S. P.; Zaheer, M. K.; Kant R.; Mohanan, K. *Chem. Commun.* **2020**, *56*, 11054.
34. Ag-Catalyzed Trifluoromethylative Ring Expansion of Isatins and Isatin Ketimines with Trifluorodiazaoethane. Jamali, M. F.; Gupta, E.; Kumar, A.; Kant R.; Mohanan, K. *Chem. Asian. J.* **2020**, *9*, 757.
33. Metal-free α -arylation of α -fluoro- α -nitroacetamides employing diaryliodonium salts. Zaheer, M. K.; Gupta, E.; Kant R.; Mohanan, K. *Chem. Commun.* **2020**, *56*, 153.
32. Phosphine-Catalyzed β -Selective Conjugate Addition of α -Fluoro- β -ketoamides to Allenic Esters Vaishanv, N. K.; Zaheer, M. K.; Kant R.; Mohanan, K. *Eur. J. Org. Chem.* **2019**, 6138.
31. Silver-Catalyzed Three-Component Route to Trifluoromethylated 1,2,3-Triazolines Using Aldehydes, Amines, and Trifluorodiazaoethane. Kumar, A.; Ahamad, S.; Kant R.; Mohanan, K. *Org. Lett.* **2019**, *21*, 2962.
30. Additive-free regio- and diastereoselective construction of fully-substituted isoxazolidines employing diazo compounds. Gupta, E.; Zaheer, M. K.; Kant R.; Mohanan, K. *Org. Chem. Front.* **2019**, *6*, 1109.
29. Additive-Free Three-Component Synthesis of Spiro-isoxazolidine-oxindoles Employing Trifluorodiazaoethane. Gupta, E.; Nair, S. R.; Kant R.; Mohanan, K. *J. Org. Chem.* **2018**, *83*, 14811.

28. Fluoride-Mediated α -Selective 1,6-Conjugate Addition of Allenic Esters to *p*-Quinone Methides. Vaishanv, N. K.; Gupta, A. K.; Kant R.; Mohanan, K. *J. Org. Chem.* **2018**, *83*, 8759.
27. Metal-Free Three-Component Assembly of Fully-Substituted 1,2,3-Triazoles. Ahamad, S.; Kumar, A.; Kant R.; Mohanan, K. *Asian J. Org. Chem.* **2018**, *7*, 1698.
26. Base-mediated 1,6-Conjugate Addition of Seyferth-Gilbert Reagent to *para*-Quinone Methides. Gupta, A. K.; Ahamad, S.; Vaishanv, N. K.; Kant R.; Mohanan, K. *Org. Biomol. Chem.* **2018**, *16*, 4623.
25. Three-Component Synthesis of 3,4-Disubstituted Pyrazoles Using Diazosulfone as a Diazomethane Surrogate. Ahamad, S.; Patidar, R. K.; Kumar, A.; Kant R.; Mohanan, K. *ChemistrySelect* **2017**, *2*, 11995.
24. Decarbonylative Arylation Employing Arynes: A Metal-free Pathway to Arylfluoroamides. Gupta, E.; Kant, R.; Mohanan, K. *Org. Lett.* **2017**, *19*, 6016.
23. Rapid and selective synthesis of spiropyrazolines and pyrazolylphthalides employing Seyferth-Gilbert reagent. Gupta, A. K.; Vaishanv, N. K.; Gupta, E.; Kant R.; Mohanan, K. *Org. Biomol. Chem.* **2017**, *15*, 6411.
22. Three-Component Domino HWE Olefination/1,3-Dipolar Cycloaddition/Oxidation Strategy for the Rapid Synthesis of Trisubstituted Pyrazoles. Ahamad, S.; Kant R.; Mohanan, K. *ChemistrySelect* **2016**, *1*, 5276.
21. Metal-Free Three-Component Domino Approach to Phosphonylated Triazolines and Triazoles. Ahamad, S.; Kant R.; Mohanan, K. *Org. Lett.* **2016**, *18*, 280.
20. Substrate-controlled Product-selectivity in the Reaction of the Bestmann-Ohira Reagent with N-unprotected Isatin-derived Olefins. Gupta, A. K.; Ahamad, S.; Gupta, E.; Kant R.; Mohanan, K. *Org. Biomol. Chem.* **2015**, *13*, 9783.
19. Domino Reaction Involving the Bestmann-Ohira Reagent and α,β -Unsaturated Aldehydes: Efficient Synthesis of Functionalized Pyrazoles. Ahamad, S.; Gupta, A. K.; Kant R.; Mohanan, K. *Org. Biomol. Chem.* **2015**, *13*, 1492.

PUBLICATIONS FROM POST-DOCTORAL RESEARCH

18. Temporary Intramolecular Generation of Pyridine Carbenes in Metal-Free Three-Component C-H bond functionalization/aryl-transfer reactions. Nawaz, F.; Mohanan, K.; Charles, L.; Rajzmann, M.; Bonne, D.; Chuzel, O.; Rodriguez, J.; Coquerel, Y. *Chem. Eur. J.* **2013**, *19*, 19578.
17. Practical and Efficient Organocatalytic Enantioselective α -Hydroxyamination Reactions of β -ketoamides. Mailhol, D.; Castillo, J. C.; Mohanan, K.; Coquerel, Y.; Rodriguez, J. *ChemCatChem.* **2013**, *5*, 1192.
16. Transition-Metal-Free α -arylation of β -ketoamides via an Interrupted Insertion Reaction of Arynes. Mohanan K.; Coquerel, Y.; Rodriguez, J. *Org. Lett.* **2012**, *14*, 4686.
15. Catalyst- and Halogen-free Regioselective Friedel-Crafts-type α -Ketoacylations. Mohanan K.; Pisset, M.; Mailhol, D.; Coquerel, Y.; Rodriguez, J. *Chem. Eur. J.* **2012**, *18*, 9217.

14. 1,3-Dipolar Cycloaddition of Hydrazones with α -Oxo-ketenes: a Three-component Stereoselective Entry to Pyrazolidinones and an Original Class of Spirooxindoles. Presset, M.; Mohanan, K.; Hamann, M.; Coquerel, Y.; Rodriguez, J. *Org. Lett.* **2011**, *13*, 4124.
13. Bestmann-Ohira-based Three-Component Regioselective Synthesis of 3-carbo-5-phosponyl pyrazoles via a Claisen-Schmidt/1,3-dipolar cycloaddition/oxidation reaction sequence. Martin, A. R.; Mohanan, K.; Toupet, L.; Smietana, M.; Vasseur, J.-J. *Eur. J. Org. Chem.* **2011**, 3184.
12. Three component reaction using the Bestmann-Ohira reagent: A regioselective synthesis of Phosponyl pyrazoles rings. Mohanan, K.; Martin, A. R.; Toupet, L.; Smietana, M.; Vasseur, J.-J. *Angew. Chem. Int. Ed.*, **2010**, *49*, 3196.
This work has been highlighted in *Synfacts* **2010**, *7*, 757
Highlighted in *Synform* (Synstories, **2010/8**, A66)
11. Expanding the boronucleotide family: Synthesis of boronoanalogues of dCMP, dGMP and dAMP. Martin A. R.; Mohanan, K.; Luvino, D.; Floquet, N.; Baraguey, C.; Smietana, M.; Vasseur, J.-J. *Org. Biomol. Chem.*, **2009**, *7*, 4369. (Accepted as a *hot article with inside cover page*).

PUBLICATIONS FROM DOCTORAL RESEARCH

10. Stereoselective synthesis of 3,4-*trans*-disubstituted γ -lactams by cerium(IV) ammonium nitrate mediated radical cyclization of cinnamamides. Nair, V.; Mohanan, K.; Suja, T. D.; Biju, A. T. *Synthesis* **2007**, 1179.
9. Novel synthesis of highly functionalized pyrazolines and pyrazoles by triphenylphosphine mediated reaction of dialkyl azodicarboxylate with allenic esters. Nair, V.; Biju, A. T.; Mohanan, K.; Suresh, E. *Org. Lett.* **2006**, *8*, 2213.
8. A convenient synthesis of 2,2-diaryl cyclobutanones by cerium(IV) ammonium nitrate (CAN) mediated oxidation of methylenecyclopropanes (MCPs). Nair, V.; Suja, T.D. ; Mohanan, K . *Synthesis* **2006**, 2531.
7. CAN mediated oxidative addition of 1,3-dicarbonyl compounds to methylenecyclopropanes: A facile synthesis of spirocyclopropyl dihydrofurans. Nair, V.; Suja, T.D. ; Mohanan, K . *Synthesis* **2006**, 2335.
6. Stereoselective synthesis of 3,4-*trans*-disubstituted pyrrolidines and cyclopentanes via intramolecular radical cyclizations mediated by CAN. Nair, V.; Mohanan, K; Suja, T.D.; Suresh, E. *Tetrahedron Lett.* **2006**, *47*, 2803.
5. CAN mediated stereoselective cyclisation of epoxypropyl cinnamyl amines to 3, 4, 5- trisubstituted piperidines and supramolecular assembly of the latter aided by ethyl acetate. Nair, V.; Mohanan, K; Suja, T.D.; Suresh, E. *Tetrahedron Lett.* **2006**, *47*, 705.
4. A convenient protocol for C-H oxidation mediated by an azido radical culminating in Ritter-type amidation. Nair, V.; Suja T.D.; Mohanan, K. *Tetrahedron Lett.* **2005**, *46*, 3217.
3. A mild and efficient procedure for the preparation of dimethyl and diallylacetals of aromatic aldehydes mediated by cerium(IV) ammonium nitrate. Nair,V.;

- Rajan, R.; Balagopal, L.; Nair, L. G.; Ros, S.; Mohanan, K. *Ind. J. Chem.* . 2005, 45B, 141.
2. CAN mediated cyclization of epoxypropyl cinnamyl ethers; a facile stereoselective synthesis of tetrahydropyran derivative. Nair, V.; Balagopal, L.; Rajan, R.; Ani Deepthi.; Mohanan, K.; Rath, N. P. *Tetrahedron Lett.* 2004, 45, 2413.
 1. Ce(IV) ammonium nitrate mediated oxidative rearrangement of cyclobutanes and oxetanes. Nair, V.; Rajan, R.; Mohanan, K.; Sheeba, V. *Tetrahedron Lett.* 2003, 44, 4585.

REVIEWS

3. Recent advances in pyrazole synthesis employing diazo compounds and synthetic analogues. Chandrasekharan, S. P.; Dharmi, A.; Kumar, S.; Mohanan, K. *Org. Biomol. Chem.* 2022, 22, org/10.1039/D2OB01918C
2. Development of small-molecule PCSK9 inhibitors for the treatment of hypercholesterolemia. Ahamad, S.; Mathew, S.; Khan, W. A.; Mohanan, K. *Drug. Discov. Today.* 2022, 27, 1332.
1. Trifluorodiazaoethane: A Versatile Building Block to Access Trifluoromethylated Heterocycles. Kumar, A.; Khan, W. A.; Ahamad, S.; Mohanan, K. *J Heterocyclic Chem.* 2022, 59, 607.

BOOK CHAPTERS

Ligand-Free, Cu-Catalyzed Reactions. Jamali, M. F.; Chandrasekharan, S. P.; Mohanan, K. in “*Copper Catalysis in Organic Synthesis*”, Chapter 13, Editors: Gopinathan Anilkumar & Miss. Salim Saranya, Wiley-VCH, 2020.

INVITED LECTURES

1. Kishor Mohanan, ‘Domino Reactions Involving the Bestmann-Ohira Reagent: A Swift Entry to Drug-like Heterocycles,’ 8-9th October 2015, Chemistry in Cancer Research St. Alberts College, Kerala.
2. Kishor Mohanan, ‘Three-Component Domino Reactions for a Rapid Entry to Drug-like Heterocycles,’ 27th January 2016, ‘Current Trends in Organic and Medicinal Chemistry’ Catholicate College, Kerala.
3. Kishor Mohanan, ‘Multicomponent Reactions for Efficient Access to Densely Functionalized Heterocycles,’ 29-31st July 2016, ‘National Colloquium on Bioorganic Chemistry’ Srinivasa Ramanujan Institute for Basic Sciences (SRIBS), Kottayam, Kerala.
4. Kishor Mohanan, ‘Three-Component Domino Reactions for a Rapid Entry to Drug-like Heterocycles,’ 16-17th December 2016, ‘Celebrating 25 Years of Harmony with Organic Chemistry, (CYHOC-2016)’ Hotel Residency Towers, Trivandrum, Kerala.

4. Kishor Mohanan, 'Trifluorodiazaoethane: A Versatile Reagent for the Construction of Medicinally Relevant Trifluoromethylated Building Blocks,' 25th February, 2022, '7th Dr. Siby Joseph Memorial Lecture Series, St. Joseph's College, Moolamattom, Kerala.
5. Kishor Mohanan, 'Expeditious, General Approaches to Important Organofluorines Employing,' 30-31st December 2021, Neoteric Advances in Chemical Sciences, University of Kerala, Kerala.
6. Kishor Mohanan, 'Trifluorodiazaoethane: A Versatile Reagent for the Construction of Medicinally Relevant Trifluoromethylated Building Blocks' 29th September 2021, 'HU-CSIR Joint International Workshop, CSIR-Central Drug Research Institute, Lucknow.
7. Kishor Mohanan, 'Trifluorodiazaoethane: A Versatile Tool for the Rapid Construction of Trifluoromethylated Building Blocks' 12th December 2021, 'Synthetic Approaches in Drug Discovery' S H Thevara, Ernakulam, Kerala.
8. Kishor Mohanan, 'Three-Component Synthesis of Trifluoromethylated Heterocycles Employing Trifluorodiazaoethane, 7-10th March 2020, 'International Conference on Organometallics and Catalysis 2020', Goa.
9. Kishor Mohanan, 'Trifluorodiazaoethane: A Powerful Reagent for the Construction of Trifluoromethylated Building Blocks, 16-18th December 2021, 'National Virtual NITT Organic Chemistry Conference (NITTOCC-2021), National Institute of Technology, Trichy, 2021 Trichy, Tamil Nadu.
10. Kishor Mohanan, 'Direct Access to Trifluoromethylated Benzo[d]azepines and Benzo[d]oxepines Using Trifluorodiazaoethane, 30th October-2nd November 2023, 'International Conference on Organometallics and Catalysis 2023', Goa.