Dr. Dharmendra Kumar Tiwari
(Assistant Professor)
Molecular Synthesis and Drug Discovery Lab,
Centre of Biomedical Research (CBMR), Lucknow

Education:

- **Ph.D.** Synthetic Organic Chemistry (2007-2012): CSIR-NCL, Pune.
- **M.Sc**. (2000-2003): V.B.S. Purvanchal University Jaunpur, U.P. INDIA.
- **B.Sc.** (1997-2000) V.B.S. Purvanchal University Jaunpur, U.P. INDIA.

Post-Doctoral:

- **2012** (April)-2013 (April): **Post-Doctoral Research**, University of Bordeaux-1, France.

Positions:

- **2019** (January) - Present: **Assistant Professor**, CBMR, Lucknow, India.
- **2015** (April)-2019 (January): **Assistant Professor**, AcSIR-New Delhi.
- **2013** (April)-2018 (April): **DST-INSPIRE Faculty**, CSIR-IICT Hyderabad.

Research Summary:

Despite the tremendous efforts in the development/use of synthetic methods in drug discovery project, organic synthesis is still the rate limiting factor. In this regard, our group will put efforts in the development new methodologies to invent new chemical entities (NCEs) using both catalytic (homogeneous and heterogeneous) and non-catalytic approaches. Recently, we have started transition metal free DMSO activation strategies to prepare various medicinally relevant N-Heterocycles. Notably, DMSO plays dual roles in these reactions as it acts as solvent and as one carbon source. Apart from this we also use heterogeneous catalysis in [3+2]-cycloaddition between isocyanides with different dipoles to access wide range variously substituted pyrrole and oxazole frameworks. Later on, we utilize these methods to synthesize Natural Products and Natural Product Like Molecules. Recently, we started exploring a new area in which we have used anthranil as a 1,4-dipole in various [4+2]-cycloaddition reactions to prepare a broad range of biologically important quinolines frameworks. Our group also enjoys the various aspects of medicinal chemistry for hit identification and lead optimizations. With our focused efforts we could successfully obtain novel hits with potent antituberculosis, antibacterial, cholesterol absorption inhibitors and metal chelating agents. These molecules are under development and might serve as effective medicines in future.

Research Areas:

- Total Synthesis of Complex Natural Products.
- Medicinal Chemistry: Synthesis of Synthetic and Nature-inspired molecules as Bioactive agents.
- Homogeneous and Heterogeneous Catalysis.
- Isocyanides/anthranils Chemistry.
- DMSO activation.

Selected Publications (* Corresponding Author):

1. DMSO as a Methine Source in TFA-Mediated One-Pot Tandem Regioselective Synthesis of 3-Substituted-1-Aryl-1H-Pyrazolo-[3,4-b]quinolines from Anilines and Pyrazolones. P. Yadav, A. Awasthi, S. Gokulnath and **Dharmendra Kumar Tiwari*** ***J. Org. Chem.*** **2021**, *86*, 2658–2666. (https://doi.org/10.1021/acs.joc.0c02696).

2. α-Amino Acids Mediated C–C Double Bonds Cleavage in Diastereoselective Synthesis of Aza-Spirocyclic Pyrazolones. Annapurna Awasthi, Pushpendra Yadav; Virendra Kumar; *Dharmendra Kumar Tiwari** ***Advanced Synthesis & Catalysis,*** **2020**, 4378 - 4383. (https://doi.org/10.1002/adsc.202000884).

3. Transition Metal-Free One-Pot Tandem Synthesis of 3-Ketoisoquinolines from Aldehydes and Phenacyl azides; Budaganaboyina Prasad, Mandalaparthi Phanindrudu, *Dharmendra Kumar Tiwari** and A. Kamal; ***J. Org. Chem.*** **2019**, 84, 12334 – 12343 (https://doi.org/10.1021/acs.joc.9b01534).

4. Transition Metal-Free Approach for the Syntheses of 4-Aryl-quinolines from Alkynes and Anilines; M. Phanindrudu, S. B. Wakade, Dipak Kumar Tiwari, Pravin R. Likhar, and **Dharmendra Kumar Tiwari*;** ***J. Org. Chem*****. 2018,** *83,* 9137–9143 (https://doi.org/10.1021/acs.joc.8b01204).

5. Transition Metal-Free Quinoline Synthesis from Acetophenones and Anthranils via Sequential One Carbon Homologation/Conjugate addition/Annulation Cascade: S. B. Wakade, D. K. Tiwari, P. S. K. P. Ganesh, M. Phanindrudu, P. Likhar, and **Dharmendra Kumar Tiwari*;** ***Organic Letters,*** **2017;** *19*, 4948–4951. (https://doi.org/10.1021/acs.orglett.7b02429).

6. α,β-Functionalization of Saturated Ketones with Anthranils via Cu-catalyzed Sequential Dehydrogenation/Aza-Michael Addition/Annulation Cascade Reactions in One-Pot: D. K. Tiwari, M. Phanindrudu, J. B. Nanubolu, and **Dharmendra Kumar Tiwari*;** ***Chemical Communications,*** **2017;** *53,* 5302 - 5305. (https://doi.org/10.1039/C7CC01195D).

7. Magnetically Recoverable Cu0/Fe_3O_4 Catalyzed Highly Regioselective Synthesis of 2,3,4-Trisubstituted Pyrroles From Unactivated Terminal Alkynes and Isocyanides; D. K. Tiwari, M. Phanindrudu, V. K. Aravilli, B. Sridhar, Pravin R. Likhar and **Dharmendra Kumar Tiwari*; *Chemical Communications*; 2016,** *52*, 4675 – 4678 *(https://doi.org/10.1039/C6CC00459H).*

8. Visible Light Photoredox Mediated sp^3C-H Functionalization and Coupling of Secondary Amines with Vinyl Azides in Flow Microreactors; **Dharmendra Kumar Tiwari,*** R. Maurya* and J. B. Nanubolu; ***Chemistry-A European Journal, 2016,*** *22, 526 – 530 (https://doi.org/10.1002/chem.201504292).*

9. Nano-copper catalysed highly regioselective synthesis of 2,4-disubstituted pyrroles from terminal alkynes and isocyanides. D. K. Tiwari, J. Pogula, *Dharmendra Kumar Tiwari** and Pravin R. Likhar, ***Chemical. Communications***. **2015**, *51*, 13646 – 13649. (https://doi.org/10.1039/C5CC04166J).

10. Magnetically Separable Nano Copper-Catalyzed Unprecedented Stereoselective Synthesis of E-Vinyl Sulfones from Tosylmethyl isocyanide and alkynes: TosMIC as a Source of Sulfonyl group; M. Phanindrudu, D. K. Tiwari, B. Sridhar, P. R. Likhar, and *Dharmendra Kumar Tiwari*;* ***Org. Chem. Frontiers*** 2016; 3, 795 (Selected for Front Cover Image). (https://doi.org/10.1039/C6QO00063K)