

**Name: Dr.Sanjay Kumar**

**Designation:** Assistant Professor in Chemistry

**Specialization:** Organic Chemistry

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### **Education**

**M.Sc. Chemistry** (1999, Kurukshetra University, Kurukshetra),

**Ph.D.** (2008, Punjabi University, Patiala)

**Title of Ph. D Thesis:** "Synthesis of Novel heterocycles of Biological Significance and New Synthetic methods"

### **Professional Experience:**

Assistant Professor, Department of Chemistry, M.M. Modi College, Patiala, India (14 July, 2008 to till date)

Raman Postdoctoral Fellow, Department of Chemistry, University of South Florida, FL, USA (November 2014 - March 2016)

### **Teaching Interests:**

- Applications of Organic Molecular Spectroscopy
- Organic Synthesis
- Heterocyclic Chemistry
- Photochemistry and Pericyclic Reactions

### **Research Interest:**

Organic Synthesis, Metal Organic Framework, Material Chemistry

### **Publications**

1. Tin(II) chloride catalysed one pot efficient and novel preparation of dihydropyrimidin-2(1H)-ones, **Sanjay Kumar**, A. Saini and J. S. Sandhu, *Indian J. Chem.*, **2004**, *43B*, 1485-1486. ([Article Link](#))
2. Nickel mediated Biginelli like three component coupling reaction: A solvent free microwave assisted synthesis of spiro-fused heterocycles, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Indian J. Chem.*, **2004**, *43B*, 2482-2484. ([Article Link](#))

3. A general method for the deoxygenation of aromatic *N*-oxides using  $\text{RuCl}_3 \cdot x\text{H}_2\text{O}$ , **Sanjay Kumar**, A. Saini and J. S. Sandhu, *Tetrahedron Letters*, **2005**, 46, 8737-8739. ([Article Link](#))
4. Cobalt (II) chloride or manganese (II) chloride or tin (II) chloride promoted one pot synthesis of dihydropyrimidin-2 (*1H*)-ones using microwave irradiation, **Sanjay Kumar**, A. Saini and J. S. Sandhu, *Indian J. Chem.*, **2005**, 44B, 762-767. ([Article Link](#))
5. Zinc mediated facile and efficient dehydration of aldoximes to nitriles, A. Saini **Sanjay Kumar** and J. S. Sandhu, *Indian J. Chem.*, **2005**, 44B, 1427-1429. ([Article Link](#))
6. An Efficient and General Method for the Deoxygenation of Organic *N*-oxides using  $\text{Zn}(\text{OTf})_2$  and  $\text{Cu}(\text{OTf})_2$ , A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Synlett*, **2006**, 395-398. ([Article Link](#))
7.  $\text{AlCl}_3$  mediated three component cyclocondensation for the synthesis of 5-unsubstituted 3,4-dihydropyrimidin-2(*1H*)-ones, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Indian J. Chem.*, **2006**, 45B, 684-688. ([Article Link](#))
8. Cerium catalysed Michael addition to  $\alpha,\beta$ -unsaturated oximes: A facile and efficient synthesis of substituted pyridines, **Sanjay Kumar**, A. Saini and J. S. Sandhu, *Indian J. Chem.*, **2006**, 45B, 429-432. ([Article Link](#))
9. A new LiBr catalysed facile and efficient method for the synthesis of 14-Alkyl or aryl 14*H*-dibenzo [*a*, *j*]xanthenes and Tetrahydrobenzo[*b*]pyrans under thermal and microwave heating, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Synlett*, **2006**, 1928-1932. ([Article Link](#))
10. LiBr-Mediated, solvent free von Pechmann reaction: Facile and efficient method for the synthesis of 2*H*-chromen-2-ones, **Sanjay Kumar**, Anil Saini, and J. S. Sandhu, *Arkivoc*, **2007**, (xv), 18-23. ([Article Link](#))
11. New Strategy for the Oxidation of Hantzsch 1,4-dihydropyridines and Dihydropyrido[2,3-*d*]pyrimidines Catalysed by DMSO under Aerobic Conditions, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Synthetic Communication*, **2007**, 37, 2317-2324. ([Article Link](#))
12. Gallium Chloride: An efficient catalyst for facile preparation of *gem*-diacetates from aldehydes, **Sanjay Kumar**, A. Saini, and J. S. Sandhu, *Arkivoc*, **2007** (xiv), 27-33. ([Article Link](#))

13. Biginelli Reaction-Review, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *J. Indian Chem. Soc.*, **2007**, 84, 959-970. ([Article Link](#))
14. Iron(III) chloride promoted solvent free, facile and efficient Friedlander synthesis of quinolines, **Sanjay Kumar**, A. Saini and J. S. Sandhu, *Synthetic Communication*, **2007**, 37, 4071-4078. ([Article Link](#))
15. Aluminium(III) halides mediated synthesis of 5-unsubstituted 3,4-dihydropyrimidin-2(1H)-ones via three component Biginelli like reaction, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Indian J. Chem.*, **2007**, 46B, 1690-1694. ([Article Link](#))
16. Gallium(III) halides catalyzed, microwave enhanced synthesis of 3,4-dihydropyrimidin-2(1H)-ones under solvent free conditions, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Indian J. Chem.*, **2007**, 46B, 1886-1889. ([Article Link](#))
17. RuCl<sub>3</sub>.xH<sub>2</sub>O: An efficient synthesis of 1,1-diacetates under solvent free conditions, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *Synthetic Communication*, **2008**, 38, 106-113. ([Article Link](#))
18. Hantzsch Reaction: New developments in the Hantzsch-1,4-dihydropyridines, A. Saini, **Sanjay Kumar** and J. S. Sandhu, *J. Scientific & Ind. Res.* **2008**, 97-111. ([Article Link](#))
19. An efficient synthesis of 1,5-benzodiazepines using GaCl<sub>3</sub> under solvent free conditions. **Sanjay Kumar** and J. S. Sandhu, *Indian J. Chem.*, **2008**, 47B, 1463-66. ([Article Link](#))
20. A practical, clean and green synthesis of Vibrindole and bis(indolyl)methanes catalyzed by alum (KAl(SO<sub>4</sub>)<sub>2</sub>.12H<sub>2</sub>O) in water. **Sanjay Kumar**, I. S. Grover and J. S. Sandhu, *Indian J. Chem.*, **2009**, 48B, 585-589. ([Article Link](#))
21. A Facile, One Pot, Solvent Free Synthesis of 14-Alkyl or aryl-14H-dibenzo[a,j]xanthenes and 12-Aryl/alkyl-8,9,10,12-tetrahydrobenzo[a]xanthen-11-one Derivatives, **Sanjay Kumar**, Arun Goyal, Harvinder S. Sohal, and Sanjeev Kumar, *Chem. Sci. Trans.* **2013** 2, 1459-1465. ([Article Link](#))
22. Glycerol Mediated, One Pot, Multicomponent Synthesis of Dihydropyrano[2,3-c]pyrazoles" Harvinder S. Sohal, Arun Goyal, Rajeev

- Sharma, Rajshree Khare and **Sanjay Kumar**, *Eur. J. Chem.***2013**, 4, 457-460. ([Article Link](#))
23. Solvatochromic Behaviour of Formazans and Contribution of Kamlet –Taft Coefficients towards Spectral Shifts of Formazans in Different Organic Solvents, Sanjeev Kumar, Rajeev Sharma, **Sanjay Kumar** and Nitika, *Chem Sci Trans.*,**2014**, 3, 919. ([Article Link](#))
24. Green synthesis, antibacterial activity and computational study of pyrazoline and pyrimidine derivatives from 3-(3, 4-dimethoxy-phenyl-1-(2, 5-dimethyl-thiophen-3-yl)-propenone, SA Khan, AM Asiri, Sanjay Kumar, K Sharma, *Eur. J. Chem.***2014**, 5, 85-90. ([Article Link](#))
25. Anionic Metal Organic Framework for Selective Dye Removal and CO<sub>2</sub> Fixation, **Sanjay Kumar**, Gaurav Verma, Wen-Yang Gao, Zheng Niu, Lukasz Wojtas and Shengqian Ma, *European Journal of Inorganic Chemistry*, **2016**,4373–4377. ([Article Link](#))
26. Partially Interpenetrated NbO Topology Metal–Organic Framework Exhibiting Selective Gas Adsorption, Gaurav Verma, **Sanjay Kumar**,\* Tony Pham, Zheng Niu, Lukasz Wojtas, Jason A. Perman, Yu-Sheng Chen, Shengqian Ma, *Crystal Growth & Design*, **2017**, 2711-2717. ([Article Link](#))
27. Defect induced broadband visible to near-infrared luminescence in ZnAl<sub>2</sub>O<sub>4</sub> nanocrystals, Megha Jain, Manju, Abhiram Gundimeda, **Sanjay Kumar**, Govind Gupta, Sung Ok Won, Keun Hwa Chae, Ankush Vij, Anup Thakur, *Applied Surface Science*, **2019**, 480, 945-950. ([Article Link](#))
28. Enhanced near-infrared luminescence in zinc aluminate bestowed by fuel-blended combustion approach, Megha Jain, Abhiram Gundimeda, Akshay Kumar, **Sanjay Kumar**, Govind Gupta, Sung Ok Won, Keun Hwa Chae, Ankush Vij, Anup Thakur, *Journal of Alloys and Compounds*, **2019**,797, 148-158. ([Article Link](#))
29. Chlorophyll Triggered One-Pot Synthesis of 3,4-Dihydropyrimidin-2(1H)-ones *via* Photo Induced Electron transfer reaction Simran Harsh, **Sanjay Kumar**, Rohit Sharma, Yogesh Kumar, Rupesh Kumar, *Arabian J. Chem.* 2020, 13, 4720-4730. ([Article Link](#))

30. Regulation of the Degree of Interpenetration in Metal–Organic Frameworks, Gaurav Verma, Sydney Butikofer, **Sanjay Kumar**, Shengqian Ma, *Topics in Current Chemistry*, **2020**, 378, 4, ([Article Link](#))
31. Excitation energy dependent switchable emission in SrZnO<sub>2</sub> nanophosphors: XAS and luminescence studies, Manju Rao, Megha Jain, Pargam vashishtha, **Sanjay Kumar**, Parasmani Rajput, Govind Gupta, Ankush Vij and Anup Thakur, *J. Mater. Chem. C*, **2020**, 8, 3147-3155. ([Article Link](#))

### **Book/Book chapter**

NIL

### **Conference / Seminars**

#### **A) Resource Person / Invited Lectures:**

1. Lecture delivered on 'Chemistry and Environment' at S.D. College (Lahore), Ambala Cantt., Haryana (March 17, 2011).
2. Chaired a Technical Session at National Chemical Constellation Cheminar, August 20-21, 2011, Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab.
3. Resource Person at national seminar on 'Toxic Trails of Punjab' on March 01-02, 2012, A.S. College, Khanna.
4. Chaired a session at 'Recent Trends in Chemical, Environmental and Material Sciences,' January 24, 2018, D.A.V. College, Abohar, Punjab.
5. Preside as Judge in the 'Regional Level Science Exhibition' organized by CBSE, New Delhi at S.D. Vidya School, Ambala Cantt. (January 24-25, 2019)
6. Resources person at National conference on 'Research in Chemical Sciences: Current Scenario (RCSCS-2019),' March 29, 2019, Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab.

#### **B) Paper presented:**

1. Selective cleavage of oximes to carbonyls using N-bromo-N-sodio-p-toluenesulphonamide, Sanjay Kumar, A. Saini and J. S. Sandhu, Presented at International Conference on Molecules to Materials (ICMM), March 3-4, 2006, SLIET, Longowal, Punjab, India.

2. Synthesis of tetrahydropyrimidine-5,5(2H)-dicyanitrile catalyzed by toluene sulfonic acid, Sanjay Kumar & Davinder Singh, presented at 'National Chemical Constellation Cheminar,' 20-21 August, 2011 Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar, Punjab.
3. Ionic liquid mediated synthesis of some multifunctionalised pyrimidine derivatives and evaluation of their antibacterial activity, Sanjay Kumar, presented at '14th Punjab Science Congress', February 07-09, 2011, Sant Longowal Institute of Engineering and Technology, Longowal, Sangrur, Punjab.
4. Clean and green synthesis of dipyrazolo[3,4-b:4',3'-e]pyridine derivatives, Sanjay Kumar and Anish Sharma, presented at International Conference on 'Innovations in Chemistry for Sustainable Development (ICSD-2011),' 03-05 December, 2011, Department of Chemistry, Panjab University, Chandigarh.
5. Bronsted acid catalyzed synthesis of some pyrazolo[3,4-d]pyrimidine derivatives, Sanjay Kumar, presented at International conference on Interdisciplinary areas with Chemical Sciences on 30th October-1st November, 2013 at Panjab University, Chandigarh.
6. An Efficient and Rapid Bromination of Activated Aromatic Compounds Under Mild Conditions, Sanjay Kumar and Akashdeep, Presented at national seminar on 'Chemistry for a better tomorrow: current trends and challenges,' March 08, 2014, Mata Gujri College, Fatehgarh Sahib
7. Synthesis of 2-aryl-1-arylmethyl-1H-benzimidazoles using silica sulfuric acid as a heterogeneous reusable catalyst, Sanjay Kumar and Rajeev Sharma, presented at 'Multi-disciplinary National Conference "Science colloquium" - Emerging Trends in Basic and Applied Sciences,' on 06-07 March 2014, DAV College Jalandhar, Punjab.
8. Efficient and Practical Synthesis of 2-Amino-4H-chromene Derivatives Using Ionic Liquids, Sanjay Kumar, Gurpreet Singh and Nitika, presented at national conference on 'Advances In Chemical & Environmental Sciences,' Arya P.G. College, Panipat, Haryana, February 27-28, 2014.

9. e-Learning in Chemistry - It's advantages and disadvantages, Sanjay Kumar, national seminar on 'Integrated Teacher Education with Technological Advances,' February 11, 2014, Mata Sahib Kaur Khalsa Girls College of education, Dhamo Majra, Patiala.
10. Synthesis of tetrahydropyrimidine derivatives and evaluation of their antibacterial activity, Sanjay Kumar, 2<sup>nd</sup> national symposium on 'Emerging Trends in Biological Sciences' November 12, 2016, Multani Mal Modi College, Patiala, Punjab
11. Synthesis of hybrid composites for the selective adsorption/separation of contaminants, Sanjay Kumar, 9th National Seminar on 'New Paradigm in Chemical Sciences: Synthetic and Analytical Perspectives-2017' 09-10 February, 2017, Punjabi University Patiala, Patiala.
12. Synthesis of metal organic framework for the selective adsorption and separation of dyes, Sanjay Kumar, national conference 'Clean & Green Energy: The Chemical & Environmental Aspects' at Bhaskaracharya College of Applied Sciences, University of Delhi, February 16-17, 2017.
13. Synthesis of 2-amino-5-cyano-6-hydroxy-4-arylpyrimidines and evaluation of their antibacterial activity, Sanjay Kumar, 'Recent Trends in Chemical, Environmental and Material Sciences,' 24 January, 2018, D.A.V. College, Abohar, Punjab.
14. Bronsted acidic heterogenous catalyst for the facile synthesis of pyrano[3,2-c]coumarins, Sanjay Kumar & Vipul Batra, 10th national conference on 'Chemical and Environmental Sciences: Innovations and Advances-2018, CES: IA-2018,' February 15-16, 2018 at Punjabi University Patiala, Patiala.
15. Succinimidinium *N*-sulfonic acid hydrogen sulfate ( $[\text{SuSA-H}]^+\text{HSO}_4^-$ ) as an efficient ionic liquid catalyst for the synthesis of tetrahydropyrimidin-2[1H]-ones, Shubham Bansal and Sanjay Kumar 'Recent Trends in Chemical and Environmental Sciences,' Department of Chemistry, Punjabi University, Patiala, February 07-08, 2019.
16. Succinimidinium *N*-sulfonic acid hydrogen sulfate as an efficient ionic liquid catalyst for the synthesis of pyrano[3,2-c]coumarins under solventfree conditions, Shubham Bansal and Sanjay Kumar, 'Recent

Advances in Chemical and Environmental Sciences' April 11-12, 2019, Multani Mal Modi College, Patiala

17. Partially interpenetrated Metal Organic Framework Exhibiting Selective CO<sub>2</sub> Adsorption, Sanjay Kumar, in national seminar on 'Hazardous Waste: education, Research & Management Strategies,' December 20-21, 2019, Government College, Una, Himachal Pradesh
18. Theoretical studies on regiospecific synthesis of some new annulated spiro[indoline-3,1'-indolizin]-2-ones, Manpreet Kaur, Mohamad Yusuf and Sanjay Kumar, in 12<sup>th</sup> national conference on 'Chemical and Environmental Sciences: Advanced Innovations - 2020' Department of Chemistry, Punjabi University, Patiala, February 19-20, 2020.

### **C) Attended**

1. Revised Accreditation Framework (RAF): Prospects and Challenges for rural and Semi Urban Colleges, IQAC, Mata Gujri College, Fatehgarh Sahib, September 13, 2019.

### **Ph.D Students**

1. Manpreet Kaur(**PhD pursuing**) Studies on 1,3-Dipolar Cycloaddition Reactions: Synthesis of New Benzo-Fused Indolizines (Date of Registration- **27 August, 2019**)

### **M.Phil/M.Sc Dissertations:**

#### **M.Phil.**

1. Aruna Sharma (2009) - Synthesis of Dihydropyridine Derivatives under Microwave Irradiation and Solvent Free Conditions
2. Vipin Singla (2009) - Synthesis and Characterization of Pyrimidine Derivatives

#### **M.Sc. Dissertations**

1. Gurcharan Singh (2011) - Synthesis, Characterization and Evaluation of Antibacterial Activity of Pyrazolo[3,4-*d*]pyrimidine Derivatives.
2. Avneet Kaur (2011)- Synthesis and Evaluation of Antibacterial Activity of Pyrimidine-5-carbonitrile Derivatives.
3. Rohit Saini (2011)- Synthesis, Characterization and Evaluation of Antibacterial Activity of Spiro fused Pyrimidine Derivatives.
4. Anish Sharma (2011) - Synthesis of Some Dipyrazolo[3,4-*b*:4',3'-*e*]pyridine and Evaluation of their Antibacterial Activity.
5. Davinder Singh (2011) – Synthesis of Some Pyrimidine dicarbonitrile derivatives and Evaluation of their Antibacterial Activity
6. Deepshikha (2011) - Synthesis of Some alkylated Pyrimidine derivatives and Evaluation of their Antibacterial Activity
7. Navleen Kaur (2011) - Synthesis of Some Pyrazolopyrimidine derivatives and Evaluation of their Antibacterial Activity
8. Gurpreet Singh (2013) – Synthesis, Characterization and Evaluation of Antibacterial Activity of 2-Amino-3-cyanochromene Derivatives
9. Reena (2017) - Synthesis, Characterization and Evaluation of Antibacterial Activity of Pyrazole based Pyrido[2,3-*d*]pyrimidine-5,7-dione derivatives
10. Ankita Sharma (2017) - Synthesis, Characterization and Evaluation of Antibacterial Activity of 1*H*-Pyrazolo[3,4-*d*]pyridine carboxylate derivatives
11. Seema (2017) - Synthesis, Characterization and Evaluation of Antibacterial Activity of 1*H*-Pyrazolo[3,4-*d*]pyridine-5-carbonitrile derivatives
12. Shubham Bansal (2018) - Synthesis, Characterization and Evaluation of Antibacterial Activity of ethyl 5-cyano-6-(dicyanomethylidene)-2-methyl-4-aryl-1,4,5,6-tetrahydropyridine-3-carboxylate derivatives

### **Workshops and training courses**

1. Attended workshop on 'IPRs Awareness Workshop' organized by NSS Department, Punjabi University, Patiala and Punjab State Council of Science & Technology (PSCST), Chandigarh (November 19, 2008)
2. Attended camp on Astronomy and Astrophysics organized by Punjab State Council of Science & Technology (PSCST), Chandigarh and M. M. Modi College, Patiala (September 20-22, 2010).

3. Attended NSS camp organized by M. M. Modi College, Patiala (December 16-22, 2010)
4. Attended Orientation Course at Academic Staff College, Punjabi University, Patiala. (October 01-21, 2012)
5. Attended Refresher Course at Academic Staff College, Punjabi University, Patiala. (May 06-25, 2013)
6. Attended UGC Sponsored Faculty Development Program at Multani Mal Modi College, Patiala. (July 01-15, 2014)
7. Attended UGC Sponsored Faculty Development Program at Multani Mal Modi College, Patiala. (January 09-16, 2017)
8. Attended UGC Sponsored Faculty Development Program at Multani Mal Modi College, Patiala. (July 20-28, 2018)
9. Attended UGC Sponsored Faculty Development Program at Multani Mal Modi College, Patiala. (July 17-22, 2019)
10. Attended Annual Refresher Programme in Teaching (ARPIT) [September 01, 2019 to December 31, 2020; Exam on February 16, 2020]
11. Attended One day workshop on 'Basics of Rheology and Dynamic Light Scattering' at GSSDGS Khalsa College, Patiala (March 06, 2020)

### **Achievements, Awards and Recognitions**

- Awarded Raman Fellowship for Post-Doctoral Research in USA by University Grants Commission (UGC), New Delhi. [5-80/2014(IC)]
- Research Project –Synthesis, characterization and antimicrobial activities of novel pyrimidine derivatives – Funded by UGC, New Delhi. (F. No. 8-2(52)/2011(MRP/NRCB))
- Organized national conference on 'Recent Advances in Chemical and Environmental Sciences' (RACES)
- Organized 'Workshop on Modern Techniques in Sciences.' (July 11-20, 2016)

- Assistant Registrar (House Examinations) since August 2010 to December 2017
- Member, Internal Quality Assurance Cell (IQAC)
- Member, UGC-CPEcommittee of the College

### **Membership**

- Member, Board of Undergraduate Studies in Chemistry, Punjabi University, Patiala (January 25, 2019 to December 31, 2020).
- Life Member, Indian Science Congress Association, Kolkata.
- Life Member, Indian Science Congress Association, Haridwar Chapter.
- Life member, Indian Society of Analytical Scientists, Delhi Chapter (LM-30/2013)