Dr. Anand Harbindu

Lead Chemist
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Academic Record

Ph. D. (Organic Chemistry) (2013) from National Chemical Laboratory, Pune (University of Pune)

M. Sc. (Chemistry) First Division (2005) from G. F. College, M.J.P. Rohilkhand University, Bareilly

B. Sc. (Chemistry) First Division (2003) from G. F. College, M.J.P. Rohilkhand University, Bareilly

Personal Summary:

Highly motivated and aspiring Scientist with 4.8+ years of experience in chemical industry R&DE (MNC) along with a background of PhD in Synthetic Organic Chemistry. Track record of publication in peer reviewed journals and patents with Successful commercialization of newly developed Non-P corrosion inhibitor program

Experience:

1. **Lead Chemist (May 2016-till date):**

   Work Summary: Specialization in design and synthesis of new molecules for cooling water application. Main focus on synthesis and evaluation of novel corrosion inhibitors for ferrous metal in different water environment. As a member of the core technologies group, provide inputs on various stage/gate and prospecting research projects, via the definition and execution of experiments, and interpretation of the results. My position is also engaged in documenting the

progress of the projects through patents and intern reports. Responsibilities include development of novel and existing synthetic processes to commercial scale by evaluating manufacturing pathways following a combination of statistical, experimental and iterative approach. As also identifying potential in sourcing and cost minimization opportunities by using existing in-house instrumentation and discovering low cost sourcing options.

2. **Principal Chemist (June 2014 to April 2016):**

   Work Summary: During this tenure, successfully achieved the development gate for the project called Yukon: synthesis of novel corrosion inhibitors yellow (Copper, Brass) metal having applications in cooling water industries. During this period got exposure to the synthesis of hetero-cycles, monomers and polymers. As a member of Yukon project group, My position is to synthesized new molecules, evaluate their performances in different water chemistries, document and present the data to global team, write intern reports, responsibility also included development of synthetic processes of lead molecule to commercial scale. Also, as per requirement formulation, blending study with different cooling water chemistries. As a result of this project, we are very close to commercialization.

3. **Post-Doctoral Research (March 2013 to May 2014):**

   Topic "Non-P Corrosion inhibitor development"

   Supervisor: Dr. Peter Reed (ECOLAB), Naperville, USA

   Summary: As Post-doctoral fellow, Molecular designing of new molecules and executed synthesis as well as electrochemical studies for corrosion inhibition of novel non-Phosphorous corrosion inhibitors for ferrous metal. Under the guidance of application and synthesis mentors, achieved lead molecules in very less spam of time. Quickly converted the concepts into molecules and evaluated for screening. In addition to making what was conceptualized, proactively did ideation and synthesis of new molecules with specific functional groups based on literature search in the topic as well using fundamental understanding of the application area.

4. **Doctoral Research (Feb. 2007-Sept. 2013):**

   Thesis title Studies Directed Towards the Synthesis of Naturally occurring Spiroacetals, Lactones and biologically active [1,2,4] triazino derivatives.

   Supervisor: Dr. Pradeep Kumar, Head, Division of Organic Chemistry (CSIR-NCL)

   Summary: Experience in multistep synthesis of drugs and other biologically active molecules using novel material and methods, product identification and purification methods such as TLC, flash chromatography and HPLC. Product characterization using various spectroscopic techniques such as NMR, Mass and IR spectroscopy.

5. **Qualified National Eligibility Test for Lectureship and Research Fellowship (NET June-2006)** conducted by UGC-Council of Scientific and Industrial Research, New Delhi, India in the field of Chemical Sciences

Fellowships and awards

- Award Certificate for successfully passing Development gate in the project "Yukon" (Nalcol An Ecolab company) 15 March **2016**
- Award Certificate for successfully passing Gate 3 in the project "Non-P Corrosion Inhibitor" (Nalcol An Ecolab company) 12 Aug. **2014**
- Senior Research Fellowship Awarded by Council of Scientific and Industrial Research (CSIR), India (www.csir.res.in) **2009-2012**
- Junior Research Fellowship Awarded by Council of Scientific and Industrial Research (CSIR), India (www.csir.res.in) **2007-2009**
- **IInd *Prize*** in Chemical Association seminar series-I, held at G.F. College, Shahjahanpur (U.P.), India during Master of Science (Chemistry) **2003-2005**

Skills

- Molecular design and synthesis of new molecules for different application *viz.* corrosion, scale and biocide application.

- Development of new single and multifunctional formulations for various corrosion inhibitor programs.
- Proven track record in cooling water application and waste water treatment.
- Proficient in carrying-out independent and collaborative research.
- Preparation and handling of air and moisture sensitive reagents/reactions.
- Structural elucidation of unknown organic compounds by advanced NMR, IR, MS and X-ray analysis.
- Experienced in purification techniques such as column chromatography, HPLC.
- Good communication, well-organized, strong problem solver and team player. Ability to collaborate with others and proven independent problem-solving. skills with technical proficiency, scientific creativity and management skills.
- Experience in writing scientific manuscripts, presenting the research findings in the meeting reviewing manuscripts and training graduate and undergraduate students with their daily research problems.
- Extensively trained in multi-steps micro-scale and macro-scale and success in process and product development.

Publications

1. "Synthesis of Aculeatins A and B via Iterative Hydrolytic Kinetic Resolution" **Anand Harbindu**, Pradeep Kumar, * ***Synthesis*** **2010**, *9*, 1479-1484.
2. "Stereoselective synthesis of (-)-galantinic acid" Abhishek Dubey, **Anand Harbindu**, Pradeep Kumar, * ***Synthesis*** **2011**, *6*, 0901-0904.
3. "Organocatalytic Enantioselective Approach to the Synthesis of Verbalactone and (*R*)-Massoialactone" **Anand Harbindu**, Pradeep Kumar* ***Synthesis*** **2011**, *12*, 1954-1959.
4. "Enantio- and Diastereocontrolled Conversion of Chiral epoxides to *trans*-Cyclopropane carboxylates: Application to the synthesis of Cascarillic acid, Grenadamide and L-(-)-CCG-II" Abhishek Dubey**, Anand Harbindu,** Pradeep Kumar, * ***Organic and Biomolecular chemistry*** **2012,** *10***,** 6987-6994.
5. "First total synthesis of Seimatopolide B" U. Nookaraju, **Anand Harbindu**, Ankushkumar Bhise, Brijesh M. Sharma, Pradeep Kumar* ***RSC Advances*** **2012,** *2*, 11231.
6. "Asymmetric route to pentadec-1-en-4-ol: Application to the synthesis of aculeatins F and epi-F, insect pheromone S/R-5-hexadecanolide and formal synthesis of solenopsin" **Anand Harbindu**, Brijesh M. Sharma, Pradeep Kumar* ***Tetrahedron Asymmetry*** **2013***, 24, 305-314.*

7. Pulchellalactam, an allosteric CD45 protein tyrosine phosphatase inhibitor from endophytic fungus Trichothecium sp." Ravi V Taware; Rupesh Gawade; **Anand Harbindu**; Shadab A Khan; Vedavati G Puranik; Absar Ahmad* (Manuscript under revision).
8. "First Asymmetric total synthesis of Modiolide B" **Anand Harbindu**, Pradeep Kumar* (Manuscript under preparation).
9. "New yellow metal corrosion inhibitor with better performance, improved stability, and lower toxicity" Yanjiao (Andrew) Xie, Jothibasu Seetharaman, Daniel Meier, Donald A Johnson, **Anand Harbindu**, Deepak Rane, and Pradeep Cheruku ***Cooling Technology Institute***, 4-8 February **2018**

Patents

1. Triazine compounds and a process for preparation thereof." **Anand Harbindu**, Pradeep Kumar **US9447105 B2 (Granted), EP2948454 B1 (Granted), WO2014115171A1**
2. "Specific 2-alkylamino-2-hydroxysuccinic acids and their salts as corrosion inhibitors for ferrous metals" **Anand Harbindu**, Santanu Banerjee, Jabir Gill, Peter Reed **US 9290851 B2 (Granted)**
3. "Water soluble substituted Imidazolines as corrosion inhibitors for ferrous metals" **Anand Harbindu**, Santanu Banerjee, Jabir Gill, Peter Reed **WO 2015187582 A1, US 9534300B2 (Granted)**
4. Substituted sugar derived 1, 2, 3 Triazole compounds and their dimers and a process for the preparation thereof. Small- **Anand Harbindu**, Brijesh M. Sharma, Pradeep Kumar **WO2014132273A1**, **2014**
5. "2-Substitued Imidazole and benzimidazole corrosion inhibitors" **Anand Harbindu**, Jothibasu Seetharaman, Deepak Rane, Donald Johnson, Jeffery Atkin **US2016/0348252 A1**.
6. "Novel Corrosion Inhibitors" **Anand Harbindu**, Jothibasu Seetharaman, Deepak Rane, Donald Johnson, **US2016/0348251 A1**
7. "Purine Based Corrosion Inhibitors" **Anand Harbindu**, Jothibasu Seetharaman, Deepak Rane, Donald Johnson, US**2016/0348253 A1**
8. Water soluble Pyrazole derivatives as Corrosion Inhibitors" **Anand Harbindu**, Jothibasu Seetharaman, Deepak Rane, Donald Johnson, **US2016/0347716 A1.**
9. "Corrosion Inhibitor Composition and use thereof" **Anand Harbindu**, Santanu Banerjee, Yin Yin Tong, Julia Savchenko, Jabir Gill, Peter Reed **WO2016206592 A1**, **CN 106319528 A**
10. "Maleic anhydride homopolymer and maleic acid homopolymer and methods for preparing thereof and Non-Phosphorus corrosion inhibitor and use thereof" **Anand Harbindu**, Santanu Banerjee, Yin Yin Tong, Jabir Gill, Peter Reed

WO2017063308 A1

11. "Tetra carboxylic acid compounds as corrosion inhibitors" **Anand Harbindu**, Santanu Banerjee, Peter Reed (**United States Provisional Patent Filed**).
12. "Synthesis of Biologically Important motifs of Pyrrole Triazinones and Indole Triazinones" **Anand Harbindu**, Brijesh M. Sharma, Pradeep Kumar (**Provisional Patent Filed**).
13. "Hydrophosphorylated polycarboxylic acids and their synergistic combinations as corrosion inhibitors for ferrous metallurgy" **Anand Harbindu**, Santanu Banerjee, Xiaodong Huang (**United States Provisional Patent Filed**).
14. "Novel Benzotriazole Derivative as Copper Corrosion Inhibitor" **Anand Harbindu**, Jothibasu Seetharaman (**United States Provisional Patent Filed**).

Symposia/Conferences

Attended 4th INSA-KOSEF symposium in Organic Chemistry: Contemporary Organic Chemistry and its Future directions, Jan 12–13, 2009 conducted at National Chemical Laboratory, Pune, India.

Attended 11th RSC-CRSI National Symposium in Chemistry, February 6–8, 2009 conducted at National Chemical Laboratory, Pune, India.

Presented poster during at 12th RSC-CRSI National Symposium in Chemistry, February 5–7, 2010 conducted at Indian Institute of Chemical Technology, Hyderabad, India.

Presented poster during National Science day celebration, 28th February 2011 conducted at National Chemical Laboratory, Pune, India.

Attended 8th Indo-French International Symposium in Chemistry, Jan 6–8, 2012 conducted at National Chemical Laboratory, Pune, India.

References

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