

## CURRICULUM VITAE

### Dr. Nishant Arunrao Dafale

M. Sc., Ph. D. (Microbiology)

Scientist, EBGD

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### Professional Record:

Currently working as a **Scientist** in the *Environmental Biotechnology & Genomic Division* at **CSIR-National Environmental Engineering Research Institute (NEERI)**, Nagpur

**Nature of work:** Handling of different R&D projects on gut microbiome, antimicrobial resistance, design of activity specific microbial consortia (Genomic and metagenomic approach)

Worked as **Senior Scientific Officer** in the *Microbiology Division* at **Indian Pharmacopoeia Commission (IPC)**, Ministry of Health and Family Welfare, **Govt. of India**, Ghaziabad

**Nature of work:** Development of new Monographs, General Chapter and verification of existing Monographs of drug substances and drug products (Therapeutic products) with special reference to Microbiology & Biotechnology

Worked as a **CSIR-Senior Research Fellow** awarded by **CSIR**, New Delhi at **CSIR-National Environmental Engineering Research Institute**, Nagpur

**Nature of work:** Biodegradation of azo dyes using sequential bioreactor and exploration of microbial population using genomic tools

Worked with **Dinshaw's Dairy Food Ltd.** Nagpur based organization reputed ISO- 9001 certification as Assist. Microbiologist (Quality Controller)

**Nature of work:** Worked in Quality Control/Quality Assurance Department for food and food products.

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**Area of Research:** Microbiology, Genomics and Biotechnology

### Current Research Interest:

- ▶ Gut microbial diversity for exploration of novel enzymes and functional genes for bioconversion of lignocellulosic biomass to valuable products.
  - ▶ Microbial analysis in different niches including MDR/pathogens through culturable/metagenomic approach
  - ▶ Design of activity specific microbial consortia for wastewater/sewage/plant growth enhancement etc.
  - ▶ Biodegradation of hazardous compounds (Bioaugmentation/biostimulation)
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### Ph. D Guide/PG Teacher

- ▶ Recognized as a **Ph. D Guide/Supervisor** for Microbiology by RTM Nagpur University, Nagpur
- ▶ Recognized as a **Ph. D Guide/Supervisor** for Microbiology and Biotechnology by North Maharashtra University, Jalgaon (MS)
- ▶ Appointed as **AcSIR faculty** for Ph. D by CSIR, New Delhi

**Number of Ph.D. Students: 03 (Submitted 01 and pursuing 02)**

### PG Supervise/Guide

Several students guided for M.Sc. & M. Tech in Microbiology and Biotechnology for their project work (dissertation) from various Universities

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### NABL Assessor:

Empanelled as **Technical Assessor** for Microbiology and **Lead Assessor** by NABL, **Quality Council of India**, New Delhi for accreditation of Government/Private/PSU laboratories of India.

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### Current Ongoing R&D projects:

- ✳ “*Functional Metagenomics of Camel Rumen Microbiome For Novel Key Glycoside Hydrolases (Gh) to Benefit Animal Nutrition and Biofuels*” (G-1-2282), sponsored by DBT (85.00 lakhs and NEERI component **31.00 lakhs**) from July 2017 to July 2020. (**Project Leader**)
- ✳ “*Microbial Diversity of Human Gut*” (CNP-7-2032), sponsored by ITC, Bangalore, (**Rs 300.00 lakhs**) from April 2014 to March 2018. (**Co-PI**)
- ✳ “*Photo-irradiation and Adsorption based Novel Innovations for Water-treatment: PANI-WATER*” (**Indo-EU**): (G-1-2459), sponsored by EU commission & DST, India (**Rs. 156.99 lakhs**) from 2018 to 2022. (**Co-PI**); [**Role in project**: Evaluation of antimicrobial resistant bacterial population/genes through culturable and metagenomic approach at sewage treatment plant (STP)]
- ✳ “*Engineered Bioremediation Approaches for Onsite Treatment of Soil Contaminated with Crude Oil*” (G-1-2463) sponsored by DBT, (**Rs. 262.55 lakhs**) from March 2019 to March 2022. (**Co-PI**)
- ✳ “*Evaluation of Bacteriophage Diversity in STPs Using Genomics Tools*” (MLP-72), sponsored by CSIR (30.00 lakhs) from January 2015 to March 2016 (**Project Leader**)
- ✳ “*Development of bamboo diversity for dust suppression at Koradi Thermal Power premises*” sponsored by Maharashtra State Power Generation Co. Ltd. (MSPGCL). (CNP-4-2334), (**Rs 9.44 lakhs**) from Dec. 2018 to Dec. 2021. (**Team member**)
- ✳ “*Harnessing Microbial Power for Treatment of Wastewater in Nullahs*” (MLP-72), sponsored by CSIR-NEERI (**Rs. 18.25 lakhs**) from Sept. 2017 to May 2018 (**Team Member**)

- ✦ *Development of green belt along Gosekhurd using Eichhornia crassipes as an amendment through ERT (Eco-rejuvenation Technology (CNP-2-2363), sponsored by Irrigation dept. Maharashtra, (Rs. 21.00 lakhs) from June 2018-2021. (Team Member).*

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### Book Contribution:

- ✦ Significantly contributed in **Indian Pharmacopoeia (IP) 2010, Indian Pharmacopoeia (IP) 2014 and IP Addendum 2012** which is a legal book to fulfill the requirements under the Drugs and Cosmetics Act 1940 and Rules 1945 for specifying the standards of medicines produced and/or marketed in India.
  - ✦ Contributed the Chapter entitled “*Quality of water for Pharmaceutical purposes*” in **Guidance Manual for Compliance of Indian Pharmacopoeia (IP)** published by Indian pharmacopoeia Commission and WHO-Country Office for India, 2012
  - ✦ Bacteriophage Diversity in Different Habitats and Their Role in Pathogen Control, **Microbial Factories, Springer Publisher**, Vol 2, 2.6, 2015.  
Nishant A. Dafale\*, Zubeen J. Hathi, Sarmistha Bit, Hemant J. Purohit
  - ✦ Microbial CO<sub>2</sub> Fixation Bioprocesses And Desert As Future Carbon Sink, **Optimization and Applicability of Bioprocesses, Springer Publisher**, Chapter 16, 325-348, 2017  
Leena Agarwal, Nishant A. Dafale, H J. Purohit
  - Pharmaceuticals and personal care products mediated antimicrobial resistance: Future challenges: Pharmaceuticals and Personal Care Products Waste Management & Treatment Technology, Chapter 17, 409-428, (2019), Elsevier, doi<https://doi.org/10.1016/B978-0-12-816189-0.00017-2>  
Shailendra Yadav, Niti Jadeja, Nishant Dafale, Hemant Purohit, Atya Kapley
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### Publications:

#### *International Research Papers in SCI Journals: (\*Corresponding Author)*

Varsha Bohra, Nishant A. Dafale, Zubeen Hathi, Hemant Purohit (2019) Understanding the Alteration in Rumen Microbiome and CAZymes Profile with Diet and Host through Comparative Metagenomic approach, **Archives of Microbiology (Accepted)**, DOI: 10.1007/s00203-019-01706-z

Varsha Jha, Nishant A. Dafale, Hemant J. Purohit, (2019) Regulatory rewiring through global gene regulations by PhoB and alarmones (p)ppGpp under various stress conditions, **Microbiology Research**, 227, Article 126309

Varsha Bohra, Nishant A. Dafale, Zubeen Hathi, Hemant Purohit (2019) Genomic annotation and validation of bacterial consortium NDMC-1 for enhanced degradation of sugarcane bagasse **Annals of Microbiology**, 69:695–711

Varsha Jha, Hitesh Tikariha, Nishant A. Dafale\*, Hemant Purohit (2018) Exploring the rearrangement of sensory intelligence in proteobacteria: Insight of Pho regulon, **World Journal of Microbiology and Biotechnology**, 34:172

Varsha Bohra, Hiitesh Tikariha, **Nishant A. Dafale\*** (2018). Genomically Defined *Paenibacillus polymyxa* ND24 for Efficient Cellulase Production Utilizing Sugarcane Bagasse as a Substrate. **Appl Biochem Biotechnol**, 187(1): 266–281. <https://doi.org/10.1007/s12010-018-2820-5>

Varsha Bohra, **Nishant A. Dafale\***, Hemant J. Purohit (2018). *Paenibacillus polymyxa* ND25: candidate genome for lignocellulosic biomass utilization, **3 Biotech**, 8(5): 248.

Krupa Parmar, Rajesh Pal, **Nishant A. Dafale\***, Hemant J. Purohit (2018). An insight into phage diversity at ecological habitats using comparative metagenomics approach, **Current Microbiology**, 75:132–141

Krupa Parmar, **Nishant A. Dafale\***, Hitesh Tikariha, Hemant J. Purohit (2018). Genomic characterization of key bacteriophages to formulate the potential biocontrol agent to combat enteric pathogenic bacteria. **Archives of Microbiology**, 200(4), 611–622.

Krupa Parmar, Zubeen Hathi, **Nishant A. Dafale\*** (2017). Control of Multi-drug Resistant Gene Flow in Environment through Bacteriophage Intervention, **Applied Biochemistry and Biotechnology**, 181(3), 1007–1029

**Nishant A. Dafale\***, Hemant Purohit (2016). “Genomic Tools for the Impact Assessment of ‘Hotspots’ for Early Warning of MDR Threats”; **Biomedical and Environmental Science**, 29(8), 143–147.

Hemant Purohit, A. Kapley, A. Khardenavis, A. Qureshi, **Nishant A. Dafale** (2016). Insights in Waste Management Bioprocesses using Genomic Tools, **Advances in Applied Microbiology**, (2016), **Advances in Applied Microbiology**, 97, 121–170.

**Nishant Dafale\***, Uttam Semwal, Rupak Rajput, G. N. Singh (2016). Selection of appropriate analytical tools to determine the potency, microbial bioactivity and resistance of antibiotics, **Journal of Pharmaceutical Analysis**, 6(4), 207–213

**Nishant Dafale\***, Uttam Semwal, Piyush Agarwal, Pradip Sharma, G. N. Singh (2015). Validation of microbial bioassay for quantification of levofloxacin in pharmaceutical preparations and its application to drug resistance, **Journal of Pharmaceutical Analysis**; 5(1), 18–26

**Nishant Dafale\***, Uttam Semwal, Piyush Agarwal, Pradip Sharma, G. N. Singh (2014). Evaluation of Preservative Effectiveness in Antacid, Cough Syrup and Ophthalmic Solution by Microbial Challenge Test. **International Journal of Pharmacognosy**, 1(3), 193–199

**Nishant Dafale\***, Uttam Semawl, Piyush Agarwal, G. N. Singh (2013). Development and validation of microbial bioassay for the quantification of potency of antibiotics cefuroxime axitel, **Analytical Methods (Royal Society of Chemistry, UK)**, (2013), 5, 690–698,

**Nishant Dafale\***, Uttam Semawl, Piyush Agarwal, Pradeep Sharma, G. N. Singh (2012). Quantification of ceftiraxime sodium in pharmaceutical preparations through new validated microbial bioassay. **Analytical Methods (Royal Society of Chemistry, UK)**, (2012), 4, 2490–2498

**Nishant Dafale\*** (2011). Exploration of genetic information from dynamic microbial population for efficiency enhancement of azo dye degrading system. **Environmental Reviews (NRC, Canada)**, 19, 310–323.

**Nishant Dafale**, Leena Agrawal, A. Kapley, Sudhir Meshram, H. Purohit & Satish Wate (2010). Selection of indicator bacteria based on screening of 16S rDNA metagenomic library from a two-stage anoxic-oxic bioreactor system for azo dyes decolorization. **Bioresource Technology**, 101, 476–484.

**Nishant Dafale**, Satish Wate, Sudhir Meshram & Nageshwara Rao (2010). Transformation of azo dyes during wet heat sterilization—A source of error in typical microbial decolorization experiments. **Int. Journal of Environmental Pollution**, 43(1-3), 264-273.

**Nishant Dafale**, Satish Wate, Sudhir Meshram & Nageshwara Rao (2010). Bioremediation of wastewater containing azo dyes using sequential anaerobic-aerobic bioreactor system and its biodiversity, **Environmental Reviews (NRC, Canada)**, 18, 21-36.

**Nishant Dafale**, Sukumar Lakhe, K. Yadav, Hemant Purohit & Tapan Chakraborty (2008). Concentration and recovery of coliphages from water with bituminous coal, **Water Environmental Research**, 80 (3), 282-288.

**Nishant Dafale**, Nageshwara Rao, Sudhir Meshram & Satish Wate (2008). Decolorization of azo dyes and simulated dye bath wastewater using acclimatized microbial consortium—biostimulation and halotolerance, **Bioresource Technology**, 99, 2552-2558.

M. Karthik, **Nishant Dafale**, Praduamya Pathe & Tapas Nandy (2008). Biodegradation enhancement of purified terephthalic acid wastewater by coagulation-flocculation process as pretreatment, **Journal of Hazardous Material** (2008), 154 (1-3), 721-730. (Impact Factor- 4.2)

**Nishant Dafale**, Satish Wate, Sudhir Meshram & Tapas Nandy (2008). Kinetic study approach of remazol black-B use for the development of two-stage anoxic-oxic reactor for decolorization/biodegradation of azo dyes by activated bacterial consortium, **Journal of Hazardous Material** (2008), 159, 319-328.

Sagrika Mohanty, **Nishant Dafale** & Nageshwara Rao (2006). Microbial decolorization of reactive black-5 in a two stage anaerobic-aerobic reactor using acclimatized activated textile sludge. **Biodegradation**, 17,403-413.

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**Paper presented in international conferences / symposium: 15**

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**Gene Bank Submission:**

16S rDNA gene nucleotide sequences: more than 200

Whole genome : ~18

Metagenome: 6

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