

Nathan Vinod Kumar

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EDUCATION

Ph.D. Biotechnology	Madurai Kamaraj University India	2012- 2017
M.Sc. Integrated Biotechnology (5 years)	Muthayammal College of Arts and Science (Periyar University, Salem), India	2006- 2011
PG Diploma Bioinformatics	Bharathiar University, India	2013- 2014

ACHIEVEMENTS

- **5th Rank-** M.Sc. Integrated Biotechnology from Periyar University, Salem
- **International Travel Support** from Science and Engineering Research Board (SERB), Government of India to present research paper at IICBE 2014 held on September 17-18, 2014 at Kuala Lumpur (Malaysia) (**Order- SB/ITS-Y/03118/2014-15**).
- **National Post-Doctoral Fellowship (N-PDF)** funded by Science and Engineering Research Board (SERB), Government of India- July 2016
- **State Eligibility Test of Tamil Nadu (TNSET 2016)** for Assistant Professorship Qualified in October 2016

Best Paper Awards

- MCAS-BIO 2008 7th National level Biological Congress on Biotechnology: Evolution and Revolution held at Muthayammal College of Arts and Science on 4 and 5th January 2008.
- National Seminar on Cyclonic changes and its impact on marine biodiversity organized by Research Department of Botany VHNSN College, Virudhunagar on 9 & 10th February 2012.
- “Sahaja Seeds Best Paper Award” at National conference on Integrated Waste Management and Energy Recover held at Bharathidasan University, Trichy on February 12th 2015.
- Delivered a Keynote lecture at ICEMEE2017 held at Bangkok, Thailand on March 10-12, 2017.
- Delivered an invited talk at Biotech 2018- The 3rd International Conference on Bioscience and Biotechnology held on 8-9 March 2018 at Colombo, Sri Lanka (Chaired a session).
- Delivered an invited talk at ICRM 2018- Fourth International Conference on Reuse and Recycling of Materials held on 9-11 March 2018 at Mahatma Gandhi University, Kerala, India (Chaired a session).

DISSERTATIONS

Deinking and colouring of waste paper using natural products in paper recycling –Ph.D .Thesis

Deals with the production and characterization of microbial enzymes like cellulase, xylanase, laccase and lipase from bacteria and fungi for deinking of paper pulp. The enzymes could enhance the paper brightness and sustain paper quality during paper recycling. Finally, microbial and plant based colourants were used for value addition of recycled paper based products.

Molecular Identification and Phylogenetic Analysis of Mangrove Associated Fungi based on ITS-PCR markers - M.Sc. Thesis

Deals with the isolation and characterization of mangrove associated fungi using ribotyping method. The fungal strains were screened for industrially relevant enzymes.

RESEARCH EXPERIENCE

➤ National Institute of Oceanography-CSIR
National Post Doctorate Fellowship Scheme September 2016 –September 2018

Study of Abilities of CO₂ Sequestering Bacteria in Reducing Carbon Foot Printing for Potential Industrial Applications

- Isolation, purification and characterization of carbonic anhydrase from bacteria isolated from mangrove and marine ecosystem
- Characterization of carbonic anhydrase gene and enzyme kinetics.
- Application of the enzyme in carbon dioxide sequestration and microbial induced carbonate precipitation (MICP).

➤ UniBiosys Biotech Research Labs, Cochin
Senior Research Officer September 2015- May 2016

- Execution of contract based research works in molecular biology, microbiology and biochemistry
- Providing academic training and guidance to Masters and undergraduate research projects.

➤ Lady Doak College, Madurai
Junior Research Fellow [DST/SSTP/TNSCST Project] January 2012- September 2015

Capacity building of women through integrated solid waste management for sustainable development

- Microbial enzyme production from mangrove and marine fungi and bacteria and characterization
- Microbial enzyme assisted deinking of waste paper pulp to enhance paper brightness
- Value addition of recycled paper based products using microbial and plant based natural colourants
- Provide training for rural women and school and college students in paper recycling

OTHER EXPERIENCE

Discovery Kids Science Adda, Bangalore
State curator-Kerala

June 2016-August 2016

- Provide training and coordinate other curators
- Supervise scientific workshops conducted by curators for school children
- Involve in hiring and orientation activities of other curators

FIELD EXPERIENCE

- Participated in Environmental Impact analysis sampling- Enayum, India; Kodimangaru, Udupi, India; mud banks of Alappuzha, Kerala; Cochin estuary mangrove regions (Puthuvype, Mangalavanam, Poovar, Valanthakad)
- Participated in multidisciplinary research cruise: 20-days (Arabian Sea, India in Marine Ecosystem Dynamics of Arabian Sea (MEDAS) (Cruise No.369) [Dec 21, 2017-Jan 9, 2018]); 18-days (Arabian Sea, India (SSK 110) [Nov 20 -Dec 9, 2017]); 17-days (Bay of Bengal, India (SSK 102)-ONGC related EIA [April 10, 2017-April 28, 2017])

SKILLS AND TECHNIQUES

- DNA and protein analysis by electrophoresis
- Enzyme characterization- quantitative assays, kinetics
- Microscopy- Light and epifluorescent microscope
- Microbiology techniques, environmental sample analysis –DO, BOD, COD, MPN
- Plant tissue culture
- Instrumentation- HPLC, GC, UV-Spectroscopy, FT-IR, flame photometer
- Bioinformatics tools- ExPasy tools, Homology modelling, STRING, Metagenome data analysis, LAZAR, XenoSite, Mol Inspiration.

MEMBERSHIP AND PROFESSIONAL CONTRIBUTIONS

- Member of Scientific Board of Biological, Pharmaceutical & Medical Sciences of International Institute of Chemical, Biological and Environmental Engineering.
- Served as Reviewer in scientific journals like Yeast and Fungal Research (Academic Journals); African Journal of Microbiology Research; Walailak Journal of Science and Technology; Waste management (Elsevier), Indian Journal of Experimental Biology, Bioresource.

PUBLICATIONS

- Vinod Kumar Nathan, Jasna Vijayan, Parvathi Ammini. 2020.** Statistical Optimization of Urease Production by *Bacillus halodurans* PO15, a Mangrove Bacterium Isolated from Poovar Mangroves, India. *Marine Life Science & Technology* [In press]
- Vinod Kumar Nathan, Jasna Vijayan, Parvathi Ammini. 2020.** Comparison of bacterial diversity from two mangrove ecosystems from India through metagenomic sequencing, *Regional Studies In Marine Sciences* [In press]
- Vinod Kumar Nathan, Parvathi Ammini. 2019.** Pesticide Application Inhibit the Microbial Carbonic Anhydrase Mediated Carbon Sequestration in a Soil Microcosm. *Environmental Science and Pollution Research*. 27(4):4468-4477.
- Vinod Kumar Nathan, Parvathi Ammini. 2019.** Carbon Dioxide Sequestering Ability of Bacterial Carbonic Anhydrase in a Mangrove Soil Microcosm and Its Bio-mineralization Properties. *Water Air Soil Pollution*. 230:192

- Vinod Kumar Nathan**, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. **2019**. Fabricating Bio-active Packing Material made from Alkali-Steam Exploded Agro-Waste using Natural Colourants. *International Journal of Environmental Science and Technology*. [In Press IF 2.037].
- Vinod Kumar Nathan**. 2019. Comparative Analysis of Carbonic Anhydrase with Reference to *Anopheles gambiae*– A Vector of Malaria and its Homology Model Prediction. *International Journal of Bioautomation*. [Accepted]
- Vinod Kumar Nathan**, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. **2018**. Enhanced Biobleaching Efficacy and Heavy Metal Remediation Through Enzyme Mediated Lab-scale Paper Pulp Deinking Process. *Journal of Cleaner Production*. 203: 926-932 [IF 5.65]
- Vinod Kumar Nathan**, Parvathi Ammini and Jasna Vijayan. **2018**. Photocatalytic Degradation of Synthetic Dyes using Iron Nanoparticles (Fe₂O₃–Np) Synthesized using *Rhizophora mucronata* Lam. *IET Nanobiotechnology*. 1-4. doi: 10.1049/iet-nbt.2018.5230 [IF 2.059]
- Vinod Kumar Nathan**, Subha Rajam K, Mary Esther Rani, Gunaseeli Rathinasamy and Kannan ND. **2018**. Biobleaching of Waste Paper using Lignolytic Enzyme from *Fusarium equiseti* VKF2- A Mangrove Isolate. *Cellulose*. 25(7): 4179-4192. [IF 3.809]
- Vinod Kumar Nathan**, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. **2018**. Paper Pulp Modification and Deinking Efficiency of Cellulase-Xylanase Complex from *Escherichia coli* SD5. *International Journal of Biological Macromolecules*. 111: 289–295 [IF 3.909]
- Vinod Kumar Nathan**, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. **2017**. Antioxidant and antimicrobial potential of natural colouring pigment derived from *Bixa orellana* L. seed aril. *Proceedings of the National Academy of Sciences, India Section B: Biological Sciences*. 1-7. [IF 0.396]
- Vinod Kumar Nathan**, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. **2017**. Low Molecular Weight Xylanase from *Trichoderma viride* VKF3 for Bio-bleaching of Newspaper Pulp. *BioResources* 12(3): 5264-5278. [IF 1.33]
- Vinod Kumar Nathan**, Mary Esther Rani, R. Gunaseeli and N.D. Kannan **2017**. Lipase Production using *Aspergillus japonicus* MF-1 through Biotransformation of Agro-Waste and Medicinal Oil Effluent. *International Journal of Current Microbiology and Applied Sciences*. 6(4): 2005-2020.
- Vinod Kumar Nathan**, Lizzy Mathew and E.G. Wesely. **2014**. Computational Modelling of Super Oxide Dismutase (SOD) of *Pisum Sativum* L. and Prediction of Mutational Variations through *in silico* Methods. *International Journal of Bioautomation*. **18(2)**: 75-88.
- Vinod Kumar Nathan**, Mary Esther Rani, R. Gunaseeli, N.D. Kannan and J. Sridhar. **2014**. Process Optimization and Production Kinetics for Cellulase Production by *Trichoderma viride* VKF3. *Springer Plus*. **3**: **92**. [IF 1.13]
- Vinod Kumar Nathan**, Mary Esther Rani, Rathinasamy Gunaseeli, Narayanan Dhiraviam Kannan and Jayavel Sridhar. **2012**. Modeling and structural analysis of cellulases using *Clostridium thermocellum* as template. *Bioinformation*. **8(22)**: 1105-1110.
- Vinod Kumar Nathan**, Lizzy Mathew and E.G. Wesely. **2012**. *In Silico* analysis of Phytochelatins: A stress related protein of *Cynodon dactylon*. *Elixir Bio. Tech*. **49**: 10152-10159.

- Vinod Kumar Nathan**, Lizzy Mathew and E.G. Wesely. 2012. *In Silico* Structure Analysis and Phylogenetic Study of Carboxysomal Protein of Microalgae - *Microcystis Aeruginosa* Involved in Carbon Dioxide Concentration Mechanism (CCM). *Bio-Science Research Bulletin*. **28(1)**: 1-11.
- Vinod Kumar Nathan**, Johnson Marimuthu Antonisamy, Wesely E G and Kavitha M S. 2012. Phytochemical and bio-efficacy studies on methanolic flower extracts of *Peltophorum pterocarpum* (DC.) Baker ex Heyne. *Asian Pacific Journal of Tropical Biomedicine*. **S641-S645**.
- Vinod Kumar Nathan**, V.Madhan Chakkaravarthy, E.G.Wesely, M.Sundararajan and Reeta Jayashankar. 2008. Biosorption of Heavy Metal (Pb) by Marine alga (*Tetraselmis gracilis*) in Cochin Estuary: A bioremediation approach; *Indian Hydrobiology*, **11(2)**:255-259.

Co-authored papers

- Parvathi A, Jasna Vijayan, Aswathy VK, **Vinod Kumar Nathan**, Aparna S, KK Balachandran. 2019. Microbial diversity along the south west coast of India influenced by co-existing upwelling and mud banks. *Molecular Biology Reports*. <https://doi.org/10.1007/s11033-019-04766-y> [IF 1.88]
- Panjami Jayan, **Vinod Kumar Nathan**, Parvathi Ammini. 2019. Characterization of marine bacterial carbonic anhydrase and their CO₂ sequestration abilities based on a soil microcosm. *Preparative Biochemistry & Biotechnology*. DOI: 10.1080/10826068.2019.1633669
- Parvathi Ammini, Jasna Vijayan, Aswathy Vijaya Krishna, Aparna Sreekumar, **Vinod Kumar Nathan** and Jyothibabu R. 2019. Bacterial metataxonomic sequence analysis reveals dominance of *Wolbachia* sp. in the deep sea sediment of the Bay of Bengal, Indian Ocean. *Genomics*. <https://doi.org/10.1016/j.ygeno.2019.06.019> [IF 3.16]
- Snehanjali K, **Vinod Kumar Nathan**, Parvathi Ammini. 2019. Anti-Biofilm Activity of Biosurfactant Derived from *Halomonas* sp., a Lipolytic Marine Bacterium from the Bay of Bengal. *Microbiology*. [Accepted]
- Thamaraiselvi L, E. G. Wesely, M.D. Nazneen Bobby, **Vinod Kumar Nathan**. 2018. Ethnobotanical survey of Palamalai Hills, Mettur Taluk, Eastern Ghats, India. *Current Botany*. **9**: 37-40.
- Jim Thomas, M. Suresh Kumar, E.G. Wesely and **N Vinod Kumar**. 2017. Antimicrobial Efficacy and Phytochemical Analysis of *Calotropis gigantea* (L.) R.Br. *Int. J. Curr. Res. Biosci. Plant Biol.* **4(9)**, 79-84.
- Velmurugan C, Arulkumar M, E.G. Wesely, Nazneen Bobby and **Nathan Vinod Kumar**. 2017. Prospecting antimicrobial potential of *Tinospora cordifolia* (Thunb.) Miers. and its phytochemical evaluation. *Global Journal for Research Analysis*. **6(5)**: 658-659.
- Arulkumar M, Velmurugan C, E.G. Wesely, Nazneen Bobby and **Nathan Vinod Kumar**. 2017. Phytochemical evaluation and antimicrobial efficacy of *Entada rheedii* Spreng. *Global Journal for Research Analysis*. **6(2)**: 624-625.
- Jim Thomas, M. Suresh Kumar, **N Vinod Kumar**, E.G. Wesely and M. Rajasekara Pandian. 2016. Antimicrobial activity and phytochemical evaluation of aqueous extract of *Artocarpus hirsutus* Lam. Bark. *Global Journal for Research Analysis*. **5(6)**: 42-44.
- Rishad K.S., Sharrel Rebello, **Vinod Kumar Nathan**, Shabanamol S. and Jisha M.S. 2016. Optimised production of chitinase from a novel mangrove isolate, *Bacillus pumilus*

MCB-7 using response surface methodology. *Biocatalysis and Agricultural Biotechnology*. 5: 143–149.

Jiji Kuriakose Kurian and **Nathan Vinod Kumar**. 2015. Sequence analysis and homology modeling of a bacterial laccase from *Pseudomonas pseudoalcaligenes*. *Journal of Advanced Bioinformatics Applications and Research*. 6(2): 23-32.

BOOK CHAPTERS

Nathan Vinod Kumar and Mary Esther Rani (2019). Microbial enzymes in paper and pulp industries for bioleaching application. eBook: Research Trends of Microbiology; MedDocs Publishers LLC. 1-10.

Nathan Vinod Kumar, Subha Rajam K, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan (2018). Surface Culturing of *Chromobacterium violaceum* MTCC 2656 for Violacein Production and Prospecting its Bio-Activities. In: Current Research In: Microbiology. Open Access eBooks [ISBN: 978-93-87500-01-3].

Nathan Vinod Kumar, Subha Rajam K, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan (2017). Prospecting Multiple Enzyme Systems of Mangrove Fungi for Dye Decolourization Potential. In: Bioremediation and sustainable environmental technologies for cleaner environment, Springer International Publishing., pp 319-327; [ISBN: 978-3-319-48438-9]

Nathan Vinod Kumar, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. Utilization of medicinal oil effluent for lipase production by *Penicillium citrinum* MKF3 (2016) Integrated Waste Management in India: Status and future prospects for environmental sustainability. Springer International Publishing., Pages 125-132 [ISBN: 978-3-319-27228-3].

Mary Esther Rani, **N.Vinod Kumar**, R. Gunaseeli and N.D. Kannan (2016). Comparative Biochemistry and Kinetics of Microbial Cellulase. In: New and Future Developments in Microbial Biotechnology and Bioengineering-Cellulase. Elsevier Netherlands. pp:19-29 [ISBN: 978-0-444-63507-5].

N.Vinod Kumar (2015). *In silico* modelling and structural analysis of some plant stress proteins based on computational approach. In: Advances in Plant Sciences. EBH Publication. In: Advances in Plant Research. Bhuyan S.I and Sony Kumari (Ed). pp 1-30. [ISBN: 978-93-83252-61-9]

Rishad K.S, **N.Vinod Kumar** and Joyal Jacob (2013). Molecular identification and bioprospecting of fungi associated with Valanthakad mangroves, Kerala, India. In: Environmental Microbiology: Techniques and Applications. Ed.(1) Jisha M.S. Bulbul Scientific Services Publication, India. pp 58-72. [ISBN 978-81-923850-7-5]

CONFERENCE PROCEEDINGS

N.Vinod Kumar, K.S. Rishad, Sharell Rebello. 2016. Prospecting indigenous rhizobacterial strains for indole acetic acid production and its plant growth promoting efficacy. Proceedings of National Seminar on Plant Science Technology for Sustainable World. Jisha M.S. (Ed.), Mahatma Gandhi University, Kottayam, Kerala, India. [ISBN:978-81-930000-8-3].

Nathan Vinod Kumar, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. 2014. Potential of Xylanase from *Trichoderma viride* VKF3 in Waste Paper Pulp Characteristics Modification. Proceeding of International conference on Chemical, Environmental and Biological Sciences (CEBS 2014), Kuala Lumpur (Malaysia). 54-60.

Nathan Vinod Kumar, Mary Esther Rani, Rathinasamy Gunaseeli and Narayanan Dhiraviam Kannan. 2014. Rapid *in vitro* propagation of *Oldenlandia umbellata* L. –A dye yielding plant. Proceedings of National Symposium. Emerging trends in Biotechnology 2014. Sarita Bhat and Padma Nambisan (Ed), Cochin University of Science and Technology, Cochin. 131-139. [ISBN: 978-93-80095-47-9]

OTHER CONTRIBUTIONS

- **Genbank Sequence Submissions -14**
- **Conference Communications:** National: 16; International: 10
- **Workshops and training attended -10**



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