

Dr. N. Nirmala

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**Professional Experience**

June, 2022 – Till date: Scientist-C & Assistant Professor, Centre for Waste Management, International Research Centre, Sathyabama Institute of Science and Technology, Chennai

Jan, 2014 – May, 2022: Scientific Assistant, Centre for Waste Management, International Research Centre, Sathyabama Institute of Science and Technology, Chennai

Publications

1. **N. Nirmala**, G. Praveen, S. Amit Kumar, P S Sundar Rajan, A. Baskaran, P. Priyadharsini, S. Sanjay, Dawn S S, K. Grace Pavithra, J. Arun, A. Pugazhendhi, “A review on biological biohydrogen production: Outlook on genetic strain enhancements, reactor model and techno-economics analysis”, Science of the Total Environment, 896, (2023) 165143 [**IF: 10.753**].
2. Anish Mariadhas, B. Sathish Kumar, K. Kabilan, Jayaprabakar Jeyaraman, Karthikeyan Alagu, Nivin Joy, J. Arun, S S Dawn, **N. Nirmala**, “Technical insights of microalgae derived bio-diesel on its performance and emission characteristics, techno- economics and practicability huddles”, Fuel, 349 (2023) 128744 [**IF: 8.035**].
3. J. Arun, R. Raghu, S. Suhail Madhar Hanif, PG Thilak, D. Sridhar, **N. Nirmala**, S S Dawn, R. Sivaramakrishnan, Nguyen Thuy Lan Chi, Arivalagan Pugazhendhi, “A comparative review on photo and mixotrophic mode of algae cultivation: Thermochemical processing of biomass, necessity of bio-oil upgrading, challenges and future roadmaps”, Applied Energy, 325 (2022) 119808 [**IF: 11.446**].
4. P. Priyadharsini, **N. Nirmala**, S S Dawn, A. Baskaran, P. Sundar Rajan, KP Gopinath, J. Arun, Genetic improvement of microalgae for enhanced carbon dioxide sequestration and enriched biomass productivity: Review on CO₂ bio-fixation pathways modifications”, Algal Research, 66 (2022) 102810 [**IF: 5.014**].
5. **N. Nirmala**, V. Shriniti, K. Aasresha, J. Arun, K.P. Gopinath, S S Dawn, A. Sheeladevi, P. Priyadharsini, Kathirvel Birindhadevi, Nguyen Thuy Lan Chi, Arivalagan Pugazhendhi, Removal of toxic metals from wastewater environment by graphene- based composites: A review on isotherm and kinetic models, recent trends, challenges and future directions”, Science of the Total Environment 840 (2022) 156564 [**IF: 10.753**].
6. J. Arun, **N. Nirmala**, P. Priyadharsini, S.S. Dawn, A. Santhosh, K.P. Gopinath, M. Govarthanan, “A mini- review on bioderived carbon and its nanocomposites for removal of organic pollutants from wastewater”, Materials Letters 310 (2022) 131476 [**IF: 3.574**].

7. J. Arun, T. Sasipraba, K.P. Gopinath, P. Priyadharsini, S. Nachiappan, **N. Nirmala**, S S Dawn, Nguyen Thuy Lan Chi, ArivalaganPugazhendhi, "Influence of biomass and nanoadditives in dark fermentation for enriched bio-hydrogen production: A detailed mechanistic review on pathway and commercialization challenges", Fuel 327 (2022) 125112 [IF: 8.035].
8. Alok Ranjan, Dawn S S, **N. Nirmala**, A. Santhosh, J. Arun, "Application of deep eutectic solvent in biodiesel reaction: RSM optimization, CI engine test, cost analysis and research dynamics", Fuel 307 (2022) 121933 [IF: 8.035].
9. **N. Nirmala**, Dawn S S, "Optimization OF *Chlorella variabilis* MK039712.1 lipid Transesterification using Response Surface Methodology and analytical characterization of biodiesel", Renewable Energy 179 (2021) 1663- 1673 [IF: 8.7].
10. **N. Nirmala**, Dawn S S, "Structural and compositional evaluation of WasteCooking Oil – Algal Oil Biodiesel using FTIR and GC- FID for improved fuel properties", World Review of Science, Technology and Sustainable Development, Vol. 17, Nos. 2/3, (2021) pp 263 - 278.
11. S. Poornapushpakala, S.S. Dawn, M. Arun Govind, A. Santhosh, **N. Nirmala**, S. Barani, M. Nirmala, "A novel image processing technique to evaluate biodiesel wastewater for recovery, recycle and reuse towards zero liquid discharge approach", Biocatalysis and Agricultural Biotechnology 31 (2021) 101874 [IF: 4.0].
12. **N. Nirmala**, Dawn S S, "Phylogenetic analysis for identification of lipid enriched microalgae and optimization of extraction conditions for biodiesel production using Response Surface Methodology Tool" Biocatalysis and Agricultural Biotechnology 25 (2020) 101603 [IF: 4.0].
13. **Nirmala N**, Dawn S S, C. Harindra "Analysis of Performance and Emission characteristics of Waste cooking oil and *Chlorella variabilis* MK039712.1 biodiesel blend in a Single cylinder, four strokes Diesel", Renewable Energy, 147, Part 1, March, 284-292, 2020 [IF: 8.7]
14. Alok Ranjan, S. S. Dawn, J. Jayaprabakar, **N. Nirmala**, K. Saikiran, S. Sai Sriram, "Experimental investigation on effect of MgO nanoparticles on cold flow properties performance, emission and combustion characteristics of waste cooking oil biodiesel", Fuel, 220, 780- 791, 2018 [IF: 8.035].
15. Alok Ranjan, Dawn S S, **Nirmala. N**, "Analytical studies on the Impact of Bio-Medical Waste on garden and landfill soil", International Journal of ChemTech Research, 10(3), 656-665, 2017.
16. **Nirmala. N**, Dawn S S, "Environmental Stress Control to enhance lipidcontent in Oleaginous Microalgae for Biodiesel production", International Journal of ChemTech Research, 9(2), 237 -241, 2016.
17. Dawn S S, **Nirmala. N**, J. Meenupriya, Tephilin Shilpa, "Quantification, Analytical Characterization and Cytotoxic studies of Mercury from Compact Fluorescence Lamps (CFLs)", 5th International Conference on Advances in Biotechnology (BioTech 2015)', 13th – 15th March, IIT Kanpur, DOI: 10.5176/2251-2489_BioTech15.24.
18. Dawn S S, **Nirmala. N**, Rashmi Kumari, Comparison of Food waste, Pongamia seed coats and Commercial Activated Carbon as effective adsorbents in Dairy Effluent Treatment", Asian Journal of Pharmaceutical and Clinical Research, 8(2), 238-241, 2015.
19. Dawn S S, Meenu Priya, Tephlin Shilpa, **Nirmala. N** 'Phytoremediation of Mercury from CFL Lamps', Asian Journal of Pharmaceutical and Clinical research, 2(4),13,2014.
20. Rashmi Kumari, **Nirmala. N**, Caroline Joshi. C, Dawn S S 'Calorific value Measurements and Optimization of Waste Cooking Oil Bio -Diesel, Crude Plastic Oil

and their blends for the synthesis of low-cost High-Energy Fuels', National Journal on Chembiosis, 5(1), 17-21, 2014.

21. Krishna Prema. K, **Nirmala. N**, "Seroprevalence of IgM and IgG antibodies against Rubella in premarital women", International Journal on Applied Bioengineering, 6(2), 35- 39, 2012.

Book Chapter

1. P. Priyadharsini, Kanchan Soni, **N. Nirmala**, S. Sanjay Kumar, S S Dawn, Ashima Bagaria, J.Arun, "Emerging Contaminants and Ways to Reduce it", Microbial Remediation of Hazardous Chemicals from Water and Industrial Wastewater Treatment Plant, 2024, Springer International Publishing, pp: 277-298
2. P. Priyadharsini, **N. Nirmala**, S. Sanjay Kumar, Kanchan Soni, M. Subathra, A. Santhosh, S S Dawn, J. Arun, Ashima Bagaria, "Removal of micropollutants from industrial wastewaters by conventional and advanced biological treatment processes", Emerging Innovative Trends in the Application of Biological Processes for Industrial Wastewater Treatment, Elsevier, pp: 337- 361.
3. J. Arun, **N. Nirmala**, S S Dawn, P. Priyadharsini, B. Sathish Kumar, K. Kabilan, "Microalgae- based processes for resource recovery from municipal wastewater treatment plants", Resource Recovery in Municipal Waste waters, 2023, ISBN: 9780323993487, Elsevier, pp: 27-40.
4. Anto Ajith, Jayaseelan Arun, S S Dawn, **N. Nirmala**, "Application of membrane techniques for water and wastewater treatment" Resource Recovery in Drinking Water Treatment, 2023, ISBN 9780323993449, Elsevier pp: 27- 45.
5. P. Priya, **N. Nirmala**, S S Dawn, Kanchan Soni, Bagari Ashima, Syed AliAbdur Rahman, J. Arun, "Application of Nanomaterials for the Removal of Heavy Metal from Wastewater", Advanced Application of Nanotechnology to Industrial Wastewater, 2023, ISBN: 978-981-99-3291-7 Springer Nature Singapore pp: 339- 351.
6. C. Marimuthu, J. Arun, M. Subathra, P. Priyadharsini, **N. Nirmala**, S. Sarojadevi, "Microalgae for Treating Wastewater", Sustainable Industrial Wastewater Treatment and Pollution Control, ISBN: 978-981-99-2560-5, 2023 Springer Nature Singapore pp: 1-12
7. Kanchan Soni, P. Priyadharsini, S S Dawn, **N. Nirmala**, A. Santhosh, Bagaria Ashima, J. Arun, "Phytoremediation of Metals and Radionuclides", Modern Approaches in Waste Bioremediation: Environmental Microbiology, Cham: Springer International Publishing, 2023, pp: 151-164.
8. **N. Nirmala**, S S Dawn, J. Arun, "Bioremediation Approaches for Genomic Microalgal Applications in Wastewater Treatment", Genomics Approach to Bioremediation: Principles, Tools and Emerging Technologies, John Wiley & Sons, Inc. 2023, pp: 199-208.
9. P. Priyadharsini, S. Sarojadevi, SA Anitha, S S Dawn, **N. Nirmala**, J. Arun, "Waste to Chemicals", Handbook of Waste Biorefinery, Springer, Cham, 2022, pp: ISBN No: 505-524 978-3-031-06561-3.
10. **Narasiman Nirmala**, MunusamySubathra, Sivaprasad Shyam, ShanmugananthamSelvanatham Dawn, Kannappan P Gopinath, Jayaseelan Arun,

“Hydrothermal gasification of biomass for hydrogen production: Advances, challenges and prospects”, Book title: Innovations in Thermochemical Technologies for Biofuel Processing , Elsevier Science, 2022, pp: 259-273. <https://doi.org/10.1016/B978-0-323-85586-0.00011-1>

11. **Narasiman Nirmala**, Dawn S S, Arun J, “Wastewater Treatment by Oleaginous Algae and Biodiesel Production: Prospects and Challenges “. Book title: Integrated Environmental Technologies for Wastewater Treatment and Sustainable Development, Elsevier Science, ISBN: 9780323984850, 01 Aug, 2022, pp: 303 -320.
12. Munusamy Subathra, **Narasiman Nirmala**, Shanmuganatham Selvanantham Dawn, Sivaprasad Shyam, Kannappan Panchamoorthy Gopinath, Jayaseelan Arun, “Thermochemical and biological conversion of biomass into biofuels and bio-chemicals”, Progressive Thermochemical Biorefining Technologies, ISBN: 9780367566098, 2021 CRC Press pp: 1- 15.
13. **Nirmala. N**, Dawn S S, Rengith, “Quantitative and Qualitative Analysis of lipid derived via cell disruption techniques from *Chlorella vulgaris* for Biodiesel production”, In: Anand G., Pandey J., Rana S. (eds) Nanotechnology for Energy and Water. ICNEW 2017. Springer Proceedings in Energy. Springer, Cham, pp. 131-139, DOI: 10.1007/978-3-319-63085-4_18

Books Edited

1. Book entitled “**Carbon - Based Materials and Environmental Remediation: Graphene, Biochar, and More**” published by IGI Global Publishers; Edited by **N. Nirmala**, J. Arun, Dawn S S, 2024 ISBN: 9798369382578.
2. Book entitled “**Environmental Applications of Carbon- Based Materials**” published by IGI Global Publishers; Edited by J. Arun, **N. Nirmala**, Dawn S S, 2024 ISBN: 979-8-3693-3625-0.
3. Book entitled “Green Prospects: Integrating Clean Energy, Wastewater and Environmental Management for a Sustainable future” published by Cambridge Scholars Publishing Limited; Edited by J. Arun, **N. Nirmala**, Dawn S S, 2024 (Ongoing).

Monograph

1. Dawn S S, **N. Nirmala**, Vinita Vishwakarma, “Biofouling in oil and gas/biofuel pipelines”, Polymetallic coatings to control biofouling in pipelines Challenges and Potential, Vinita Vishwakarma, Dawn SS, K. Gobi Saravanan, A. M. Kamalan Kirubaharan, Saravanamuthu Vigneswaran, Gayathri Naidu, CRC Press, Taylor, and Francis.

Nucleotide Sequence Submission to Gene Bank for Accession Number

1. **Nirmala N**, Dawn S S, Ebenezer, V., “*Chlorella variabilis* small subunit ribosomal RNA gene, partial sequence: Chloroplast”, Accession Number: MKO39712.1, 16TH October, 2018. <https://www.ncbi.nlm.nih.gov/nuccore/MKO39712>

Patents

Granted

1. Filed No: 201641037331 “**Compact Sensor System for Train Compartment Washbasin Water Recovery**”.

Published

2. Filed No: 201641037330, “**Analysis and Development of Bio Plastic from Algal Biomass for Composites**”.
3. Filed No: 202241058320 “**A Fuel Blend and Method of Synthesis Thereof**”.
4. Filed No: 202241058319 “**Bioethanol and Fuel blend comprising the same**”.
5. Filed No: 202441033877 “**A Method of Synthesizing Keratin- Based Bioplastic Film from Human Hair**”.

Applied

6. Filed No: 202441064422 “**A Composition for Improving Soil fertility and method Thereof**”.
7. Filed No: 202441075117 “**A Method of Synthesizing Activated Carbon for Applications in Biodiesel Technology**”.

Funded Project

1. **(2018 - 2019)** Recycle of Ritual Waste Materials to Incense Sticks- an Eco-Friendly Approach for Rural Industrialization and Entrepreneurship Development funded by Unnat Bharat Abhiyan, Centre for Rural Development and Technology, Indian Institute of Technology, Delhi **(Rs. 50,000/-)**.
2. **(2022- 2025)** Science Technology and Innovation Hub in Kattumannar Koil, CD Block, Cuddalore District, Tamil Nādu State” funded by Department of Science and Technology, Government of India **(Rs.2,36,05,264/-)**.

Consultancy Projects

S. No	Name	Title of the Project	Institution of the Intern Students	Mentor	Duration	Amount
1	Mr. Karthik.U Ms. Ramashanthi. S	Modification of Lichens by Thermophilic Genes for Absorption of Excessive Carbon Dioxide and Bioenergy Production	SreeSastha Institute of Engineering and Technology, Chennai	Dr. Dawn S S Dr. Nirmala N	October, 2018 – March, 2019	Rs. 20,000/-
2	Mr. Suresh Mr. Tharun	Algae Cultivation for	Loyola Institute of	Dr. N. Nirmala	October, 2019 –	Rs. 18,000/-

		extraction of lipids	Science and Technology, Chennai		March, 2020	
3	Ms. Sreejitha	Algae cultivation for extraction of lipids and its blend with Jet fuel for its performance, combustion and emission analysis	Jawaharlal Nehru College of Engineering, Palakad	Dr. N. Nirmala	November , 2019- March, 2020	Rs. 40,000/-
4	Mr. V. Murugesan	Biodegradation of Organic Municipal Solid Waste using Enzymes enriched organic formulation (EEOF)	Industrial Consultancy	Dr. Vinita Vishwakarma Dr. D. Rajha Amarnath Dr. N. Nirmala Dr. Dawn S S	June, 2019	Rs. 1,00,000/-
5	Ms. Felcy	Bioplastic production from Palmyra sprout peel powder and collagen from chicken skin	Loyola Institute of Science and Technology, Chennai	Dr. N. Nirmala Dr. Dawn S S	August, 2021	Rs. 32000/-
6	Ms. Immaculate Angela	Phytochemical screening, Quantitative Analysis of plant materials of crude plant extracts from <i>Calotropis gigantea</i>	Pachayappa's College, Chennai	Dr. N. Nirmala Dr. Dawn S S	June, 2022	Rs. 40000/-

Award/Prize/Certificates

1. **“Organic Pot”** selected in Confederation of Women Entrepreneurs (COWE), TamilNadu – one among Top 3 ideas, conducted by Anna University in association with Department of Science and Technology (DST)
2. **“Patho- Controller”** was selected in BEST–2015 Top 20 Ideas conducted by ABLEIndia in association with Department of Biotechnology (DBT).
3. **UTKRISHT SANSTHAN VISHWAKARMA AWARDS 2019** - One of the teams selected as Nominees for the Award after clearing two rounds of Presentation.
4. **“High Impact Journals publication award”** for the period of June 2019 to June 2020 by Sathyabama Institute of Science and Technology on 5th September 2020.
5. **“High Impact Journals publication award”** for the period of July 2021 to June 2022 by Sathyabama Institute of Science and Technology on 5th September 2022.

6. **“High Impact Journals publication award”** for the period of July 2021 to June 2022 by Sathyabama Institute of Science and Technology on 5th September 2022.
7. **“High Impact Journals publication award”** for the period of July 2022 to June 2023 by Sathyabama Institute of Science and Technology on 5th September 2023.
8. **“Highest Funded Research Project”** for the period of July 2022 to June 2023 by Sathyabama Institute of Science and Technology on 5th September 2023.

Microenterprise Established

1. Establishment of POOMANAM Microenterprise at Kumizhi Village for production of Incense sticks from Ritual Waste to the self-help group women.

Conference/Awareness Program/Workshop/ Training Program/ Seminar Organized

1. “3rd International Conference on Waste, Energy and Environment”- ICWEE- 2023 organized by the Centre for Waste Management during 5th July to 7th July, 2023.
2. A Workshop on Solid Waste Management Challenges for Healthier Environment organized by the Centre for Waste Management during 9th January, 2020.
3. Hands- on Training on Algae extraction for Bio-fuel Production Technologies (ABT – 2019) on monthly basis by Centre for Waste Management, Sathyabama Institute of Science and Technology.
4. Two Days Hands – on Training on Microbiology Techniques by Centre for Nanoscience and Nano Technology & Centre for Waste Management, Sathyabama Institute of Science and Technology during 22nd & 23rd August, 2019.
5. An Awareness Workshop on Solid Waste Management Challenges towards Healthier Environment (SWACHH) for Group A & Group B officers of Controllorate of Quality Assurance (Heavy Vehicles), Ministry of Defense, Avadi during 18th March, 2019.
6. Corporate Actions & Responsibility towards Environmental Sustainability (CARES) organized for Korean intern students from Hyundai during 18th February, 2019.
7. “International Conference on Waste, Energy and Environment (ICWEE– 2018)” by Centre for Waste Management, Sathyabama Institute of Science and Technology during September 5 -7, 2018.
8. “Research Exploration for Novel and Ecofriendly Waste Handling Techniques” (RENEW-2018) A Mini Project Competition for Under Graduate Students from August, 2018 – July, 2019 funded by Ministry of Human Resource and Development (MHRD)
9. Workshop on “Waste, Energy & Environment” for SBOA Coimbatore school children at Sathyabama Institute of Science & Technology during January 9 -10, 2018.
9. “Research Exploration for Novel and Eco-friendly Waste Handling Techniques” (RENEW-2017) A Mini Project Competition for Under Graduate Students from August, 2017 – July, 2018 Ministry of Human Resource and Development (MHRD)
10. “Awareness Programme on Pasumai Eriporulum Adhan Athyavasiyamum Sirappu Vizhipunarvu Mugam” to Woman Self-help group residing at Sithalapakkam, Chennai in 2017.
11. Organizing member in “National Conference on Chemical Engineering for

Sustainable Energy & Environment”- (ChemSEE – 2016) organized by Department of Chemical Engineering & Centre for Waste Management, Sathyabama Institute of Science & Technology

12. An Awareness Workshop on Waste - A Resourceful Neglect (WARN-15) for Undergraduate Students on 8th August, 2015
13. “Research Exploration for Novel and Ecofriendly Waste Handling Techniques” (RENEW-2016) A Mini Project Competition for Under Graduate Students from August, 2016 – July, 2017, funded by Ministry of Human Resource and Development (MHRD)
14. Awareness program for “Safe Handling of Bio-Medical Waste”, for waste handling personnel’s in 2015.
15. A Training Program on “Pilot Scale Biodiesel Production & Characterization” on monthly basis funded by Ministry of Human Resource and Development (MHRD).
16. A Training Program on “Gas Chromatography equipped with TCD/ FID”, on monthly basis, funded by Ministry of Human Resource and Development (MHRD).

Educational Qualification

1. **Ph.D. (Biotechnology)**, Sathyabama Institute of Science and Technology, Chennai, 2022. Title: “**Microbial Oil extraction for enhanced bio-fuel production**” funded by Ministry of Human Resource and Development (MHRD), Government of India.
2. **M.Sc. (Applied Microbiology)**, Ethiraj College for Women, Chennai, 2010 - 2012, (72.8%).
3. **B.Sc. (Applied Microbiology)**, Ethiraj College for Women, Chennai, 2007- 2010, (63.8%)

Hands on Experiences in handling high end Instruments

1. Operation of Quality Analysis of Methyl esters/solvents using YL clarity 6500 Gas Chromatography equipped with FID and TCD detector
2. Operation of 50 L biodiesel production pilot plant
3. Operation of Biodiesel Characterization equipments such as Viscometer, Copper strip corrosion test bomb, Flash point and Fire Point Apparatus, Cloud point and pour point Apparatus, Digital Bomb Calorimeter etc for testing the quality of different oil and biodiesel samples.

Skill

1. Analytical studies of Fourier Transform Infrared Spectroscopy, Nuclear Magnetic Resonance and Gas Chromatography, Polymerase Chain Reaction etc
2. Response Surface Methodology (RSM), Origin Pro-8
3. Isolation of Genomic DNA and its amplification by using PCR techniques
4. Biochemical techniques for identification of genus and species level of microorganisms.
5. Isolation and Enumeration of microbes, pure culturing and Antibacterial activity testing
6. Biodiesel production from Different oil sources and its characterization
7. Microbial Oil extraction for Bio -fuel Application
8. Bioremediation of mercury from E-waste
9. Characterization of organic compounds using spectral analysis (FTIR, ¹H NMR and ¹³C NMR)
10. Sustainable Biopolymer production from Organic Residues