Deborah Gnana Selvam Alexander

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A passionate lecturer who loves teaching microbiology to all kinds of learners and enjoys watching them appreciate the beauty of biology. In addition to teaching, I love research on the antibiotic resistance of bacteria.

Education

- Cochin University of Science and Technology — Cochin, Kerala
  PhD under the Faculty of Marine Sciences (Spl. in Microbiology) — 2017
- The American College — Madurai, Tamil Nadu
  MSc in Immunology and Microbiology — 2008
- Lady Doak College — Madurai, Tamil Nadu
  BSc in Zoology (Spl. in Biotechnology) — 2006

Research Experience

Department of Marine Biology, Microbiology and Biochemistry, Cochin University of Science and Technology, Cochin, Kerala, India

Doctoral Research

- Isolation and identification of bacteria from water, sediment, shrimps and algae
- Isolation, maintenance and identification of bacterial cultures
- Biochemical, molecular characterization & antimicrobial assays for Vibrio sp. and Aeromonas sp.
- Analysis of physical and chemical characteristics of water and sediment samples
- Bioassays employing adult and larval shrimps and Artemia nauplii

Junior Research Fellow in University Grants Commission-Special Assistance Program Project: Water and sediment sampling in the Cochin backwaters and off shore areas; identification if phytoplankton, isolation and storage of bacteria, fungi and actinomycetes (October 2008-October 2009).

The American College, Madurai, South India

- Dissertation work: Isolation and identification of pesticide-resistant bacteria and the bioremediation of the pesticide, fenvalerate

Lady Doak College, Madurai, South India

- Dissertation work- "Madurai Heart Watch-II"

Credentials

- UGC-Research Fellowship in Science for Meritorious Students (2009-2014).
- Student Project Scheme by TNSCST, Govt. of Tamil Nadu, India (2017-2018).
- **Passed IELTS with a band score of 8 (Listening- 9.00; Writing- 7.00, Reading- 8.50, Speaking- 8.00) (September, 2020)**

Trainings and Workshops Attended

- Basic Techniques in Biology- Lady Doak College, Madurai.
- Techniques in Molecular Biology- Aravind Medical Research Foundation, Madurai.
- Advanced techniques in Molecular Biology- J. J. College of Arts and Science, Pudukottai.

- DNA barcoding of marine fauna- National Institute of Oceanography, RC-Cochin
- Two-day practical course in DNA Taxonomy and Phylogeny- Satyabama Institute of Science and Technology
- Completed an online course on Whole **genome sequencing of bacterial genomes - tools and applications** offered by the **Technical University of Denmark (DTU).**

Teaching Experience

- Has been a lecturer for the past 4 years (**From 21st June, 2017 onwards to till date**) in the Dept. of Microbiology, The American College, Madurai, India (Has taught both theory and lab courses at the undergraduate and post-graduate level).
- Has supervised eleven MSc dissertations in microbiology
- Passed the **ICAR-National Eligibility Test** for lectureship in October 2013.
- Has been a co-convenor of the Practical Workshop- I on Molecular Techniques in Life Sciences organized by the American College Central Instrumentation Centre (ACCIC) – 20th and 21st April, 2021.
- Appointed as Co-Ordinator (**From 1st October, 2021 onwards**), Department of Medical Lab Technology, American College- Community College, The American College, Madurai.
- Completed **Adaptive Design for Learning (ADL)** online course offered by Ateneo de Manila University's Institute for the Science and Art of Learning and Teaching (Ateneo SALT Institute) under the United Board Faculty Scholarship Program.
- Participated in **Faculty Development Programme** at Kodaikanal between 16th and 18th August, 2024 conducted by AIACHE, New Delhi, in collaboration with The American College, Madurai.

Research Interests

My primary research interest all these years have been monitoring antibiotic resistance in bacteria isolated from different environmental sources. This interest was sparked after I observed the prevalence of widespread multidrug resistant bacterial shrimp pathogens isolated from aquaculture ponds. This interest grew and now I am interested in finding out if the antibiotic resistance genes are present in the plasmids or in the bacterial chromosome. We tried to establish this through plasmid curing and bacterial transformation experiments. At the same time, I have also tried to isolate seaweed associated actinomycetes with antimicrobial properties. Since post graduate studies, one of the other areas I was interested in was bioremediation. My dissertation was on the bacterial biodegradation of pesticides and I have supervised MSc dissertation works on bacterial and fungal degradation of HDPE and LDPE. After spending years on biochemical characterization of bacteria, I am also carrying out 16S rRNA amplification and sequencing. As whole genome sequencing is the way forward, I am pursuing a course on Whole Genome Sequencing of bacterial genomes- tools and applications from the Technical University of Denmark.

Technical skills

Microbiology: liquid and solid culture of bacteria, fungi, biochemical and molecular identification of Vibrio parahaemolyticus and Aeromonas species; Antibiotic resistance assay screening.

Staining and Microscopy: Simple and differential staining (Negative staining, Gram staining and spore staining), light microscopy.

Molecular biology: PCR, DNA gel analysis, quantification and extraction of DNA, Online tools in bacterial genome sequencing

Hydrochemistry: Quantification of nitrate, nitrite, phosphate and total ammonia nitrogen in water samples by spectrophotometric methods.

Animal maintenance: Handling and feeding of Penaeus monodon post larvae and adults breeding, Hatching of Artemia cysts, bioassays with Artemia nauplii.

Analytical methods: Titrations, spectrophotometry.

Publications

Antony AC, Silvester R, Aneesa PA, P V V**, Selvam A DG**, Salim V, Paul MK, Abdulla MH. Occurrence, virulence, and AMR profile of *Vibrio parahaemolyticus* isolated from shellfish growing areas located along the south-west coast of India. J Water Health. 2024 Sep;22(9):1594-1605. doi: 10.2166/wh.2024.338.

A Laboratory Manual _ Practical Workshop- I on Molecular Techniques in Life Sciences (2021). (Editors: S. Jemima Balaselvi Juliana, T. Angeline, P. Dailiah Roopha, **Deborah Gnana Selvam A.,** Johnson Christdas E., and Jennifer Michellin Kiruba N.). ISBN 978-93-80368-40-5.

Ramya, D., Thatheyus, A. J., Juliana, S. J. B., Kiruba, N. J. M., & **Selvam A, D. G**. (2022). Physical characterization and kinetic studies of Zn (II) biosorption by *Morganella morganii* ACZ05. *Water Science and Technology*, *85*(4), 970-986.

Alexander, D. G. S., & Thatheyus, A. J. (2021). Fungal bioremediation of toxic textile dye effluents. In Fungi Bio-Prospects in Sustainable Agriculture, Environment and Nano-technology (pp. 353-380). Academic Press.

Deborah Gnana Selvam A., Thatheyus A.J. (2018) Microbial Degradation of Petroleum Hydrocarbons: An Overview. In: Kumar V., Kumar M., Prasad R. (eds) Microbial Action on Hydrocarbons. Springer, Singapore.

Deborah Gnana Selvam, **A**., Mujeeb Rahiman, K. M. and Mohamed Hatha, A. A. (2012). An Investigation into Occasional White Spot Syndrome Virus Outbreak in Traditional Paddy Cum Prawn Fields in India. The Scientific World Journal, 11 pp. doi:10.1100/2012/340830

Deborah Gnana Selvam, **A.,** Thatheyus, A. J. and Vidhya, R. (2013). Biodegradation of the Synthetic Pyrethroid, Fenvalerate by Pseudomonas viridiflava. American Journal of Microbiological Research 1: 32-38.

Thatheyus, A. J. and **Deborah Gnana Selvam, A.** (2013). Synthetic Pyrethroids: Toxicity and Biodegradation. Applied Ecology and Environmental Sciences 1: 33-36.

Ghosh, S., RingØ, E., **Deborah**, **G. S. A.,** Mujeeb Rahiman, K. M. and Hatha, A. A. M. (2011). Enterobacter hormaechei BAC 1010 from the gut of flathead grey mullet as probable aquaculture probiont. Journal of Nature Science and Sustainable Technology 5: 189-199.

Silvester, R., **Deborah Alexander** and Mohamed Hatha Abdulla Ammanamveetil (2015). Prevalence, antibiotic resistance, virulence and plasmid profiles of Vibrio parahaemolyticus from a tropical estuary and adjoining traditional prawn farm along the southwest coast of India. Annals of Microbiology. 65: 2141–2149.

Silvester, R., **Alexander, D**., Santha, S. and Hatha, M. (2015). RAPD PCR discloses high genetic heterogeneity among Vibrio parahaemolyticus from various environments along the southwest coast of India. Annals of Microbiology. 66: 925-929.

Ajin, A. M., Reshma Silvester, **Deborah Alexander**, Nashad, M. and Mohamed Hatha Abdulla (2016). Characterization of blooming algae and bloom-associated changes in the water quality parameters of traditional pokkali cum prawn fields along the South West coast of India. Environmental Monitoring and Assessment, 188: 145.

Mujeeb Rahiman, K. M., Mohamed Hatha, A. A., **Deborah Gnana Selvam, A**. and Thomas, A. P. (2016). Relative Prevalence of Antibiotic Resistance among Heterotrophic Bacteria from natural and culture environments of freshwater prawn, Macrobrachium rosenbergii (De Man, 1887). Journal of World Aquaculture Society 47: 470-480.

Ghosh, S., **Selvam**, **D. G. A.,** Neethu C. S, Saramma, A. V. and Hatha, A. A. M. (2013). Diversity and antimicrobial activity of Lactic Acid Bacteria from the gut of marine fish Rastrelliger kanagurta against fish, shrimp and human pathogens. Journal of Marine Biological Association of India 55: 22-27

Ghosh, S., Einar RingØ, **Deborah Gnana Selvam**, **A.,** Mujeeb Rahiman, K. M., Naveen Sathyan, Nifty John, Hatha, A. A. M. (2014). Gut Associated Lactic Acid Bacteria Isolated from the Estuarine Fish Mugil cephalus: Molecular diversity and antibacterial activities against pathogens. International Journal of Aquaculture 4: 1-11.

Lekshmi S, Vijayalakshmy KC, Reshma Silvester, GSA Deborah and AV Saramma (2016). Antibacterial activity of Chroococcus minutus (Kützing) Nägeli isolated from Cochin estuary against selected pathogens. International Journal of Fisheries and Aquatic Studies 4: 700- 703

Reshma Silvester, **Deborah Alexander**, Mohamed Hatha, A. A., Ally Antony. (2017). GroEL PCR- RFLP – an efficient tool to discriminate closely related pathogenic Vibrio species. Microbial Pathogenesis 105:196-200.

Reshma Silvester, **Deborah Alexander**, Maya George and A. A. M. Hatha. (2017). Prevalence and multiple antibiotic resistance of Vibrio coralliilyticus, along the southwest coast of India. Current Science 112: 1749-1755.

Paper presentation and participation in seminars and conferences

Participated in a One-day workshop on Art and Science Of Methodical Scientific Wrtiing And Publishing In An High Impact Journal (March, 2023) conducted by the IQAC and the Office of Dean, Research, The American College, Madurai.

Participated in an International Conference on Innovative Approaches in Life Sciences (ICIALS-23) organized by the Department of Food Science and Nutrition, The American College, Madurai.

Bhuvaneshwari, S., **Deborah Gnana Selvam, A.** and A. Joseph Thatheyus. "Biodegradation of the synthetic pyrethroid pesticide, deltamethrin by the soil bacterium, Pseudomonas viridiflava". National conference on Recent trends in Life Science: Research, Practices and Application for sustainable development organized by Bharathiar University, Coimbatore on 7th and 8th September, 2017 in collaboration with National Academy of Biological Sciences, Chennai. ISBN: 978-93870-0007-0

Deborah Gnana Selvam, Mujeeb Rahiman, K. M., Mohamed Hatha, A. A. (2012). Recurring algal blooms and resultant changes in water quality- a probable trigger for WSSV outbreak in seasonal paddy cum prawn fields. 24th Kerala Science Congress.

Ghosh, S., **Deborah Alexander**, Mohamed Hatha, A. A. (2011). Diversity and antibacterial activity of Lactic acid bacteria from fish gut and their potential utility in combating diseases in aquaculture. 23rd Kerala Science Congress.

Ghosh, S., Mujeeb Rahiman, K. M., **Deborah Alexander** and Hatha, A. A. M. (2011). Lactic Acid Bacteria from the gut of estuarine fish as a possible probiont in different aquaculture operations. National Symposium on Emerging trends in Biotechnology, CUSAT.

Deborah Gnana Selvam, A., Mujeeb Rahiman, K. M., Shahul Hameed, K., Mithun Shah, H., Gayathri, C. R., Vinod Sami, A. V. Saramma and A. A. M. Hatha (2010). Organic Pollution of The Feeder Canal- A Major Threat to the Traditional Prawn Farms at Edavanakad Region of Cochin Backwaters. International Conference on Green path to Sustainability: Prospects and Challenges held at The Assumption College, Changanaserry, Kerala.

Deborah Gnana Selvam, A., Mujeeb Rahiman, K. M., Midhun Shah Hussein, Shahul Hameed, Gayathri and Hatha, A. A. M. (2010). Physico-chemical and bacteriological profiles of paddy-cum prawn fields adjoining the Cochin backwaters. National Conference on Conservation of the Wetlands- A Multidisciplinary Approach- St Joseph's College for Women, Alappuzha.

Deborah Gnana Selvam, A., Sumi Liz Jose, Sreedevi, O. K., Shyam Kumar, Saramma, A. V. and Hatha, A. A. M. (2009). Spatial and Temporal Distribution of Heterotrophic Bacteria, Coliforms, Fungi and Phytoplankton

along the Coastal Waters of Cochin. National Seminar on Emerging Trends in Environment and Development with a focal theme on Climate Change and Water Resources.

References

Dr A. Joseph Thatheyus
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