

CURRICULUM VITAE

DR.SUJATHA.C.H



Designation : Associate Professor

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Address : Department of Chemical Oceanography,
School of Marine Sciences, CUSAT,
Kerala, India. Pin: 682019

Date of birth : 25-04-1960

Area of research : Marine Environmental Chemistry

RESEARCH EXPERIENCE

1. Pre-Doctoral Research at Vector Control Research Centre (ICMR), Pondicherry, India.

- ◆ Synthesis of different types of novel mosquito attractant/repellant –organic compounds – like amides, esters etc., also for larvicidal activities.
- ◆ Phytochemical studies with medicinal plants - Soxhlet Extraction, Solvent Extraction, TLC/ Column Chromatography Separation, Compound identification, Separation of Active components Structure elucidation and identification using modern analytical instruments like spectrophotometers (UV, IR & NMR) and High Pressure Liquid Chromatography.
- ◆ Controlled release formulation of pesticides for the control of different disease vectors of mosquito etc.

2. Doctoral Research at Department of Chemical Oceanography, CUSAT.

Title of thesis: Dynamics of some environmentally significant pesticides in a Tropical waterway – A toxicological approach.

- ◆ Studies on the pesticide interactions in the marine environment:
 - Temporal / spatial distribution of pesticides
 - Chemo toxicity of marine organisms, Bivalves and partitioning of separation of biochemical constituents like lipids, proteins , sugars, lactic acids, etc.,
 - Sorptional characteristics of Malathion and Methyl parathion

3. Post-Doctoral Research at Department of Chemical Oceanography, CUSAT.

- ◆ Chemical interaction of TBTO in marine environment
- ◆ Baseline studies on the chemical constituents of Kayamkulam estuary with special reference to the NTPC area.
- ◆ Spatial and temporal diversity of hydride elements in coastal oceanic waters

EDUCATION

- MBA (HRM): Pondicherry University (UGC sponsored programme 2005-2007).
- Ph.D. Marine-Environmental Chemistry (CUSAT, INDIA), 1992.
- M.Sc.Ed Pure Chemistry (Under NCERT) (Mysore University, Mysore, INDIA). 1984.

PROFESSIONAL EXPERIENCE

- **Associate Professor** (2013 onwards) Dept. of Chemical Oceanography, Cochin University of Science and Technology, CUSAT, Kerala, INDIA.
- **Associate Professor and Head** (2013-2015) Dept. of Chemical Oceanography, Cochin University of Science and Technology, CUSAT, Kerala, INDIA.
- **Senior Lecturer** (March 2001) Joined as Lecturer (Permanent Post) at the Dept. of Chemical Oceanography, Cochin University of Science and Technology, CUSAT, Kerala , INDIA. Teaching courses for M.Sc. Hydrochemistry (I, II, III, IV –Semester) both Theory and Practical; M.Phil (Chemical Oceanography), and M. Sc Marine Biology /Marine Geology teaching Chemical Oceanography.

- **Lecturer (1996- 2001)** - Worked (on contract basis) at School of Marine Sciences, CUSAT, offered classes on Subject--Chemical Oceanography & Hydrochemistry for M.Sc Hydrochemistry, Marine Biology, Marine Geology and Oceanography Courses.
- **Lecturer (1991 -1993)** - Worked at School of Environmental Studies, CUSAT and taught Environmental Chemistry & Instrumentation Analytical Methods for Environmental Chemistry Course.
- **Lecturer (1986 to 1988)** - Taught Environmental Pollution and Insecticides Chemistry M.Sc Medical Entomology at Vector Control Research Center (VCRC), Pondicherry. INDIA.
- **Post Graduate Teacher (1984)** – Worked as PGT at Kendriya Vidhyalaya, Naval Base, Cochin.

Number of ongoing projects : 3

Sr. No	Title	Cost (in rupees)	Duration	Sponsoring Agency
1.	Detection of DMSP (Dimethyl Sulphonio Propionate) Production in Phytoplankton Species Using <i>ddd</i> gene Encoding Primers	39,13,540/-	2014-2017	DBT

2.	“Biogeochemistry of selected Trace elements (Fe,Zn,Mn and Cu) in the realm of Arabian Sea with special reference to Kerala Coast”	29,10,000/-	2012-2017	MoES, (Geotraces-SIBER) Govt.of India
3	Quantification of trace metals and its counterparts as an interlocking system for revealing sediment/water/air status in the southern tip of peninsular India.	66,00,000/-	2012-2017	MoES, Govt.of India

Number of completed projects : 4

Sr. No.	Title	Cost (in rupees)	Duration	Sponsoring Agency
1	Contaminant Characterisation of Soil in selected areas (Chittor and Kanjikode) of Palakkad district, Kerala	14, 80,000/-	2013-2015	KSCSTE. Govt. of Kerala
2	“Distribution Characteristics of DMS and DMSP in the Cochin Estuarine System(CES)”	27,09,000/-	2008-2011	MoES, Govt.of India
3	”Hydro geochemical quality assessment of ground waters in selected districts of	9,10,800/-	2008-2011	KSCSTE, Govt.of

	Kerala”			Kerala
4	“Biogeochemistry of the mineral resources in the lime shell deposits at the coastal belt of Kannur District, Kerala. “ Kannur District, Kerala.”	70,000/-	2008-2010, Minor project	UGC, India

Publications:

1. Gayathree Devi P.K and **Sujatha, C.H** (2016) A Preliminary Approach of The Spatio-Temporal Distribution of Cationic Aerosol Components in the Ambient Atmosphere of Kochi, India. *Atmospheric Pollution Research*,(in press).
2. Gayathree Devi P.K, Akhil P.S and **Sujatha, C.H** (2016) Metal Signature of Atmospheric Aerosol from Kochi, the Queen of Arabian Sea, Kerala, India. *Journal of Pollution*, 2(3): 247-267.
3. Gayathree Devi P.K and **Sujatha C.H** (2016). Source Apportionment of Ambient Aerosol Particulate Matter (AAPM) In Kochi City, Kerala, India, *Journal of Environmental Science, Computer Science and Engineering & Technology*, Vol.5.No.1, 075-088.
4. Gayathree Devi P.K, **Sujatha, C.H**, Akhil P.S and Rajesh R (2016) Spatio - Temporal Assessment of Air Pollutants in Kochi City, Kerala, India. *Journal of Environmental Science, Computer Science and Engineering & Technology*, Vol.5, 289-305.
5. AthiraSreekanth, S.K.Mrudulrag, Eldhose Cheriyan, **C.H.Sujatha** (2015) Trace metal enrichment and organic matter sources in the surface sediments of Arabian Sea along southwest India (Kerala Coast), *Marine Pollution Bulletin*, Volume 101, Issue 2, 30, 938–946.

6. Eldhose Cheriyan, AthiraSreekanth, S.K.Mrudulrag , **C.H.Sujatha** (2015) Evaluation of metal enrichment and trophic status on the basis of biogeochemical analysis of shelf sediments of the southeastern Arabian Sea, India, *Continental Shelf Research*, 108,1–11.
7. Salas P M, **Sujatha C H** and Ratheesh Kumar C S (2015) Fate and Source distribution of Organic Constituents in a River dominated Tropical Estuary. *Journal of Earth System Science*, 124, No. 6, pp. 1265–1279.
8. Akhil P S and **Sujatha C H** (2015) Residual Archives on Organochlorine Insecticides in the Core Sediment of a Tropical Estuary, India. *Journal of Pollution* 1(4): 347-362.
9. Shibini Mol P A, **Sujatha C H** (2015) Elucidation of Contaminant-Induced Toxic Responses in the Biota of Lake Vembanad, Kerala, India, DOI:10.1080/10807039.2014.960722. *Human and Ecological Risk Assessment: An International Journal*.
10. Larissa Dsikowitzky, Inga Nordhaus, **Sujatha C.H**, Akhil P.S., Kunjupilai Soman, Jan Schwarzbauer (2014) A combined chemical-biological assessment of industrial contamination in an estuarine system in Kerala, India. *Science of the Total Environment*. 348-362.
11. P S Akhil, **C H Sujatha** (2014) Spatial budgetary evaluation of organochlorine contaminants in the sediments of Cochin Estuary, India. *Marine Pollution Bulletin*. 78,246–251.
12. P. M. Deepulal **C. H. Sujatha** & T. R. Gireesh kumar (2014) Distribution of REEs along South Coast of India. *Indian Journal of Geo-Marine Sciences*, 43(1), 96-105.
13. Shibini Mol P A, Dayala V T, **Sujatha C H** (2014) Spatial Relationship among Phytoplankton Abundance and Physiochemical parameters around the Coastal waters of Kerala. *International Journal of Current Research*. Vol. 5, Issue, 10, pp.3094-3099.
14. Dayala V T, Jose Mathew, **Sujatha C H** (2014) Distributional Characteristics of Dimethyl Sulphide (DMS) Related To Phytoplankton Biomass and Nutrient Dynamics in the Cochin Estuary. *International Journal of Current Research*. Vol. 5, Issue, 10, pp.3155-3164.
15. Dayala V T, Salas P M, **Sujatha C H** (2014) Spatial and Seasonal variations of Phytoplankton species and their relationship to physicochemical variables in the Cochin

- Estuarine waters, Southwest coast of India. *Indian Journal of Marine Sciences*. Vol 43(6), 937-947.
16. Manju P.Nair , Akhil P.S and **Sujatha C.H** (2014) “ Toxic Metal Distribution in the Core Sediment of Cochin Estuarine System (CES)” - *International Journal of Environmental Research*. 8(1): 133-138, Winter 2014.
 17. Jose M, Gayathree Devi P K, **Sujatha C H** (2013) Spatio - Temporal Trace Gas and Trace Metal Foot Prints in an Industrial and Marine Scenario. *Journal of Atmospheric Pollution*. 1 (1), pp 12-17
 18. K.N Sumangala, P.S Akhil, **C.H Sujatha** (2013) Hydrogeochemical Quality Assessment of Ground Waters in Ernakulam District, Kerala, India. *Journal of Environmental Science, Computer Science and Engineering & Technology*. Vol.2. No.4, 1353-1368.
 19. Akhil P.S, Manju P.Nair and **Sujatha C.H** (2013) “Core Sediment Biogeochemistry in Specific Zones of Cochin Estuarine System (CES)”- *Journal of Earth System Science*. 122, No. 6, pp. 1557–1570.
 20. Manju.P.Nair and **Sujatha.C.H.** (2013) Environmental Geochemistry of Core Sediment in the Cochin Estuary (CE) - *Research Journal of Chemical Sciences*. Vol. 3(4), 65-69.
 21. Manju P Nair and **Sujatha C H** (2013) Biennial Metal Discrepancy in the Surface Sediment of Cochin Estuarine System, *International Journal of Recent Scientific Research*. Vol.4 (9), 1365–1369.
 22. Manju.P.Nair and **Sujatha.C.H** (2013) “Organochlorine Pesticide residues in the sediments of Kerala coast” – *Global Journal of Applied Environmental Sciences*.
 23. Jyothish Kumar T and **Sujatha CH** (2013) Characterization of heavy metal and pesticide contamination in soils of Kasargod district, Kerala. *International Journal of Geology, Earth and Environmental Sciences*.Vol.1 36-40.
 24. Manju P Nair, Akhil P S and **Sujatha C H** (2013) “Geochemistry of Core Sediment from Antarctic Region” *Research journal of Chemistry and Environment* **17**(2), 8-12.
 25. Manju.P.Nair., **C.H. Sujatha.** (2013) Iron fractionation in the Sediments of Kerala Coast- *International Journal of Green and Herbal Chemistry* 2(3) 555-561.
 26. Akhil P S , Sumangala K N and **Sujatha C H** (2013) “Groundwater Hydrochemistry in

- the Crystalline Laterites/ Forest Loams of Kasargod District, Kerala, India.” *Water Science and Technology: Water Supply*. 13.2, 486-498.
27. Manju.P.Nair., **C.H. Sujatha** (2013) Fractionation of Phosphorus in the Sediments of Kerala Coast- *Journal of Chemical, Biological and Physical Sciences* 3(3) 2274-2278.
 28. Akhil P S and **Sujatha C H** (2012) “Prevalence of Organochlorine Pesticide Residues in Groundwaters of Kasargod District,India” *Toxicological and Environmental Chemistry* Vol. 94, No. 9.1718–1725.
 29. Manju.P.Nair., **C.H. Sujatha** (2012). Nutrient Dynamics in the Sediments of Kerala Coast- *International Journal of Environmental Sciences*.
 30. Manju P Nair & **Sujatha C H** (2012) "Biogeochemical quality assessment of the sediments in Kerala Coast " *International Journal of Environmental Sciences*, Integrated Publishing Association 3(1), 707-719..
 31. P. M. Deepulal & T. R. Gireesh kumar ,**C. H. Sujatha** (2012) “Behaviour of REEs in a tropical estuary and adjacent continental shelf of Southwest coast of India: Evidence from anomalies”, *Journal of Earth System Science*, 121, No. 5, pp. 1215–1227.
 32. P.R Anupama Nair and **C.H Sujatha** (2012) “Organic Pollutants as Endocrine Disruptors”, *Environmental Chemistry for a Sustainable World Vol.1*, Springer April 2012.
 33. N. Aneeshkumar, **C.H. Sujatha** (2012)” Biomarker Pigment Signatures in Cochin Back Water System - A Tropical Estuary south west coast of India” *Estuarine, Coastal and Shelf Science*, 99 (2012) 182e190.
 34. P. M. Deepulal & T. R. Gireesh kumar ,**C. H. Sujatha** & Rejomon George (2011) Chemometric Study on the Trace Metal accumulation in the Sediments of the Cochin Estuary—Southwest Coast of India, *Environmental Monitoring Assessment*, 184(10):6281-2.
 35. Ranjitha Raveendran & **Sujatha C H** (2011) “Quantization of specific trace metals in bivalve, Villorita Cyprinoides Var Cochinchensis in the Cochin Estuary”, *Indian Journal of Geo-Marine Sciences* Vol.40 (2), June 2011.

36. V.B. Pratheesh, K. Nirmala, and **C.H. Sujatha**. (2010) Water Quality Aspects of a Temporary Water Body in Palakkad District, Kerala, *Asian Journal of Water, Environment and Pollution*.
37. **C.H. Sujatha**, V.B. Pratheesh and Yung-Tse Hung (2010) River and Lake Pollution; Handbook of Environmental and Waste Management, Vol-1; 2010. World Scientific Publishing Co. Pte. Ltd, Singapore.
38. **C.H. Sujatha**; V.B. Pratheesh, Anupama Nair.P.R and Yung-Tse Hung (2010) “Impact Assessment on Aquatic Pollution” Handbook of Environmental and Waste Management”, Vol-1; 2010. World Scientific Publishing Co. Pte. Ltd, Singapore.
39. **Sujatha C.H**; Nify Benny (2009). “Impact of December 2004 Tsunami on Indian Coasts and Mitigation Measures” Book Chapter in the book Natural and anthropogenic Disasters: Vulnerability, Preparedness and Mitigation edited by Dr. madan Kumar Jha.
40. V.B.Pratheesh, Nify Benny & **C.H Sujatha**. (2009) Isolation, Stabilization and Characterization of Xanthophyll from Marigold Flower- *Tagetes Erecta-L*, *Modern Applied Sciences* Vol-3(2):19-28.
41. **Sujatha C.H** ; Nify Benny; Ranjitha Raveendran., Fanimol C.L. & Samantha N.K (2009) “Nutrient dynamics in the two lakes of Kerala, India.” . *Indian Journal of Marine Sciences*, Vol. 38(4), pp 451- 456.
42. **Sujatha C H**, Aneeshkumar.N and Renjith. K.R (2008). “ Chemical Assessment of sediment along the coastal belt of Nagapattinam, Tamil Nadu,India,after the major Asian tsunami” in the *Journal Current Science*, 95, August 2008.
43. Anu Gopinath, Neema Joseph, **Sujatha C.H**. and Nair S.M. (2002) Forms of nitrogen (NO₃ – N; NO₂ – N and NH₂CONH₂ –N) and their relations to A.O.U. in the Indian coastal waters of Arabian sea. *Chemistry and Ecology*. 18:233-244.
44. Lalu Raj, **Sujatha C,H.**, Nair S.M., Kumar N.C. and Chacko J. (2002) Base-line studies on the chemical constituents of Kayamkulam estuary near to the newly commissioned NTPC power station. *Indian J. Environmental Protection*.
45. Kalesh N.S., **Sujatha C.H**. and Nair S.M. (2001) Dissolved folin phenol active substances (Tannin and Lignin) in the seawater along the west coast of Indian. *J.Oceanog*. 57:29-36.

46. **Sujatha, C.H.**, M.Rethi and S.M.Nair. (2000) Hydride-forming Toxic Metals (Hg, As, Sb and Se) in the Surficial Sediments of a Tropical Estuary. *Inter.J.Environmental Studies*.00.1- 14
47. **Sujatha,C.H.**, Nair, S.M., and J.Chacko. (1999) Determination and distribution of Endosulfan and Malathion in an Indian Estuary. *Water Research*. 33: 109-114. 2.
48. **Sujatha, C.H.**, Nair, S.M, and Jacob Chacko. (1995) Tissue lipid level of the clam, *Villorita cyprinoides* var *cochinensis*, exposed to endosulfan, malathion and methyl parathion. *Environ. Toxicol. Water Qual.* 10, 4, 1995.
49. **Sujatha, C.H.**, Nair, S.M. and Jacob Chacko.(1995) Pesticide induced physiological change in an estuarine clam. *Oebalia*. XXI: 181-186.
50. **Sujatha, C.H.**, Nair, S.M, and Jacob Chacko. (1995) TBTO induced physiological and biochemical changes in a tropical estuarine clam. *Bull. Environ.Contam. Toxicol.*56: 303-310
51. **Sujatha, C.H.**, Nair, S.M, Kumar, N.C. and Jacob Chacko. (1994) Distribution of DDT and its metabolites in an Indian waterway. *Environ. Toxicol. Water Qual.* 9: 155-160.
52. **Sujatha, C.H.**, Nair, S.M, and Jacob Chacko. (1994) Sorption of Malathion and Methyl parathion by tropical aquatic sediments: II Influence of pH. *Toxicol. Environ Chem.* 41: 47-55.
53. **Sujatha, C.H.**, Nair, S.M, and Jacob Chacko. (1994) Sorption of Malathion and Methyl parathion by tropical aquatic sediments: Influence of salinity. *Toxicol. Environ. Chem.* 43: 175-181.
54. **Sujatha, C.H.**, Nair, S.M, Kumar, N.C. and Jacob Chacko. (1993) Distribution of organochlorine pesticides in a tropical waterway: HCH and its isomers. *Toxicol. Environ. Chem.* 39: 103-111.
55. **Sujatha, C.H.** and Jacob Chacko.(1992) Organo-phosphorus pesticide adsorption variability in diverse estuarine sediments. *Toxicol. Environ. Chem.* 36: 65-73.
56. Prasad, K., **Sujatha,C.H.**, and Kalyanasundaram,M.(1992) Insect growth regulating activity of substituted 4-phenoxy alkyl and halo9phenoxy acetamides against mosquito vectors. *Tropical Biomedicine.* 9: 59-62.

57. **Sujatha, C.H.** and Jacob Chacko. (1991) Malathion sorption by sediments from a tropical estuary. *Chemosphere*. **23**: 168-180.
58. **Sujatha, C.H.**, Vasuki, V., Marriappan, T. Kalyanasundaram, M. and Das, P.K. (1988) Evaluation of plant extracts for biological activity against mosquitoes. *International Pest. Control*. **30**: 11-24.
59. Nisha George, **Sujatha, C.H.** and Kalyanasundaram, M. (1987) Controlled release formation of mosquito larvicide with biodegradable ingredients. *Indian Journal of Medical Research*. **86**: 728-732.
60. Nisha George, Ramaiah, K.D., **Sujatha, C.H.** Kalyanasundaram, M. and Das, P.K. (1986) Oviposition attractancy of some substituted esters and the pheromone extracted from egg rafts against *Culex quinquefasciatus*. *Current Science*. **55**: 1205-1207.
61. Kalyanasundaram, M., Amalraj, D., Paily, K.P., Nisha George and **Sujatha, C.H.** (1986) Synthesis of substituted amides for repellency against mosquitoes. *Current Science*. **55**: 266-268.

Books

1. Akhil P S and Sujatha C H (2016) RESIDUAL ORGANOCHLORINE INSECTICIDE ARCHIVES IN THE AQUATIC SEDIMENT *Distribution, Trends and Prevailing Factors*, Lambert Academic Publications, Germany. ISBN: 978-3-659-89988-1.
2. Niffy Benny, Sujatha C H (2012) ENRICHMENT OF SULPHUR COMPOUNDS IN THE COCHIN ESTUARINE SYSTEM: *Sulphur Chemistry of Cochin Estuarine System*. 3 May 2012 05/2012; LAP LAMBERT Academic Publishing. ISBN: 978-3-8484-8909-1.

Book Chapters

1. Anupama Nair, Sujatha C H (2012) Organic Pollutants as Endocrine Disruptors.
2. Sujatha C H, Pratheesh V B, Yung-Tse Hung (2010) River and Lake Pollution; Handbook of Environmental and Waste Management.
3. Sujatha C H, Prathesh V B, Anupama Nair, Yung-Tse Hung (2010) Impact Assessment on Aquatic Pollution” Handbook of Environmental and Waste Management.

4. Sujatha C H, Niffy Benny (2009) Impact of December 2004 Tsunami on Indian Coasts and Mitigation Measures.

Popular Science Article

1. Akhil P S, **Sujatha C H**: *Cochin Estuary High on Insecticides, Says Study*. The Hindu National Daily. 01/2014;
2. Akhil P S, **Sujatha C H** “*Groundwater remains polluted in Kasargod*” Hindu National Daily News Paper, October 2012.

Technical Report

1. **C H Sujatha**, P M Deepulal and P S Akhil (2014) Biogeochemistry of Southern Ocean with Special Reference to Water and its Niche. *Southern Ocean Expedition2010, Technical Report: National Centre for Antarctic and Ocean Research, 5862.*

Awards/Honours/ Fellowships etc received

- Best presentation award for the poster entitled “**DISTRIBUTION PATTERN OF TRACE ORGANIC CONTAMINANTS IN THE COCHIN ESTUARINE SYSTEM (CES), INDIA: AN OVERVIEW**” in the **National Conference on Analytical Science and Technology** held during 24-26 September 2015 at, **Munnar**, Kerala, India, organized by Indian Society of Analytical Scientists Kerala Chapter (ISASK).
- Best presentation award for the paper entitled “**Seasonal Trends in the Aerosol Components Over the Cochin Estuarine system** ” held during 13-15 July 2011 at National Institute of Ocean Technology, **Chennai**, India, organized by Ocean Society of India (OSICON’11).
- Best presentation award for the poster entitled “**Environmental factors controlled by phytoplankton biomass and production rate in the estuarine waters off Cochin**” held during 13-15 July 2011 at National Institute of Ocean Technology, **Chennai**, India, organized by Ocean Society of India (OSICON’11).

CAREER ACHIEVEMENTS

- Led two Research students and One M.Sc student to participate the **First Indian GEOTRACES cruise 2013**, in the Indian Ocean water mass onboard **ORV Sagar kanya** from March 2 to May 10. Organized by Physical research Laboratory (PRL), Ahmadabad, India, under the aegis of Ministry of Earth Science, Govt of India, in association with the MoES funded GEOTRACES-SIBER project.

- Two Research students under my guidance, participated in “**IVth Indian Scientific Expedition to Southern Ocean (Antarctica) 2010**” carried out from January-11 to March-25, onboard **O.R.V Sagar Nidhi**, reached up to **66°35’ S** at the coastal regions of Antarctica. Organized by National Centre for Antarctic and Ocean Research (NCAOR), Goa, India, under the aegis of Ministry of Earth Science, Govt of India.

- Participated in the cruise No.267 as Deputy Chief Scientist on “**Equatorial Indian Ocean Process Study –Dynamics and Biogeochemistry (EIOPS)**” onboard ORV Sagar Kanya carried out from 15 January-13 February 2010.

NUMBER OF Ph.D DEGREE AWARDED

1. Anupama Nair P R (2008) “Stress Responses of Stinging Catfish HETEROPNEUSTES FOSSILS (BLOCH) to Organophosphorous Insecticide Monocrotophos”(Supervising Co-Guide)
2. Nify Benny (2009) “Unravelling a Benchmark for Sulphur Akin in the Cochin Estuarine System”.
3. Aneesh Kumar N (2009) “Phytoplankton Pigment Signatures as a Biomarker in a Tropical Estuary”.
4. Sumangala K N (2013) “Hydro Geochemical Quality Assessment of Groundwater- A General Perspective”
5. Pratheesh V. B (2013) “ Ecotoxic Metal Records and its degree of Geochemical Symphony in the Niche of Cochin Estuarine System- A Theraptic Perspective”

6. Radhika .R (2013) “Implications of Hydrobiology and Nutrient dynamics on trophic structure and interactions in Cochin Backwaters”.
7. Deepulal P. M (2014) “Ecotoxicological Assessment of Antifouling Biocides in the sediments of Cochin Estuarine System”.
8. Renjitha Raveendran (2014) “ Biochemical Aspects of shell Mineralisation in the Estuarine Mollusc- *Villorita cyprinoides* var. *cochinensis* (Mollusca: Bivalvia)”.
9. Manju P Nair (2015) “Geochemical Metal Fractionation Profile of the Core Sediment in the Cochin Estuarine System”.
10. Akhil P S (2015) “An Appraisal of Core Sediment Archives on Organochlorine Insecticides in a Tropical Estuary, India”.
11. Salas P M (2016) Provenance, Isolation and Characterisation of Organic Matter in the Cochin Estuarine Sediment - “A Diagenetic Amino Acid Marker Scenario”.

No of Ph.D Degree Awarded & Their Outcomes

1. **Anupama Nair P R (2008)** “Stress Responses of Stinging Catfish *HETEROPNEUSTES FOSSILS* (BLOCH) to Organophosphorous Insecticide Monocrotophos”(Supervising Co-Guide). The present work attempts to assess the toxicity of organophosphorous insecticide monocrotophos on the experimental organism, a stinging Catfish *Heteropneustes fossilis* (Bloch), and to probe into the stress responses of the organism in terms of inhibition of enzymes , retardation of growth, damage and dysfunction of the tissues.
2. **Nify Benny (2009)** “Unravelling a Benchmark for Sulphur Akin in the Cochin Estuarine System”. The research work designed to understand the chemistry of Sulphur and its compounds in the Cochin estuary and to reduce its pollution by the way of phytoremediation using the wheat grass. The highlighted outcomes can be utilised in future for controlling environmental pollution activities. It also useful for thorough understanding of biogeochemical processes of the estuary.
3. **Aneesh Kumar N (2009)** “Phytoplankton Pigment Signatures as a Biomarker in a Tropical Estuary”. The study illustrates the use of sedimentary pigments as a biomarker for long term changes in phototrophic community structure and tropical status in Cochin

backwater system. The research work has provided valuable basic information on hydrochemistry of CBWS and the factors regulating the phytoplankton production and also the biomarker pigment characterization. Spatio-temporal variation of pigment and its relation with macro & micro nutrients, taxonomic composition and community structure of phytoplankton were also described.

4. **Sumangala K N (2013)** “Hydro Geochemical Quality Assessment of Groundwater- A General Perspective”. The research work provides the valuable basic information on hydrogeochemical quality assessment of ground water from Ernakulam district and it adds immensely to the knowledge on these subjects and its impacts on the socio-economic status of the people included also the suggestion for some remedial measures to maintain the quality of the ground water. Besides the water quality maps can be used to plan future water works in that area including the suitable source identification.
5. **Pratheesh V. B (2013)** “Ecotoxic Metal Records and its degree of Geochemical Symphony in the Niche of Cochin Estuarine System- A Theraptic Perspective”. The thesis contains the results obtained on the investigation of water and sediment of Cochin estuarine system with a view to evaluate the chemical contents with special reference to characterize the distribution and concentration of various heavy metal ions. Besides, incorporated various biodegradable adsorbents were used for reducing the residual levels of trace metals by means of adsorption techniques.
6. **Radhika .R (2013)** “Implications of Hydrobiology and Nutrient dynamics on trophic structure and interactions in Cochin Backwaters”. It provides a systematic approach regarding the influence of physicochemical parameters, nutrient dynamics and sedimentary parameters on different trophic levels. This study forms a benchmark linking productivity and hydrology in realizing the changes in Cochin backwaters.
7. **Deepulal P. M (2014)** “Ecotoxicological Assessment of Antifouling Biocides in the sediments of Cochin Estuarine System”. The thesis describes the significant information on antifouling biocides in the sediments of Cochin estuarine system and its toxicological impact on estuarine organisms. The study clearly defined the geochemical setting of the sedimentary environment, assessed the biochemical composition of the sediments and featured a clear understanding of the quantity and quality of organic matter which

influence the distribution of antifouling biocides. The assessment of the redox condition of the sediments of Cochin estuary had been investigated by employing the distribution pattern of rare earth elements including the important trace metals which are used for antifouling biocides.

8. **Renjitha Raveendran (2014)** “Biochemical Aspects of shell Mineralisation in the Estuarine Mollusc- *Villorita cyprinoides* var. *cochinensis* (Mollusca: Bivalvia)” is an imperative and appealing work and provides noteworthy information on shell remineralization by estuarine molluscs, *Villorita cyprinoides* var. *cochinensis*. Accumulation of heavy metals in sediment and the organisms reflected the contamination status of the study area.
9. **Manju P Nair (2015)** “Geochemical Metal Fractionation Profile of the Core Sediment in the Cochin Estuarine System”. Ecological risk of metals in the estuary was investigated with reference to the biennial profile of surface and core sediment in CES. Sequential extraction procedure (SEP) was applied for the partitioning of selected metals . The surface sediments were collected from 17 prominent stations (grouped in to three zones – south, middle and north) of CES and twelve core sediments were extracted from the South, Middle and North regions of the CES, six in each year of sample collection. Results showed that the distribution of metals in the sediment was not uniform over the whole study area and revealed extreme contamination in the northern region than the other zones in the estuary, suggesting that industrial activities were the major contributing source for the metal pollution. According to the sediment quality guideline and previous literature comparison, CES showed to be polluted in heavy rate. This study inferred that the enhanced concentration of metals in northern part of the CES is due to strong anthropogenic influences. Investigation on the influence of anthropogenic activities using GCI resulted in moderate to severe pollution for all the metals and specifically for Cd. SQG comparison generate severe contamination for Cd , Co, Cr, Pb, Mn, Zn and moderate for Cr and Ni. Except elements Ni and Zn, all the metals showed enrichment in comparison with previous reports placing the region as one among the impacted estuaries around the world. Fractionation profile showed intensified metal content in non residual fraction, creating severe threat to the aquatic system. EXC and CA

fractions dominated in the fractionation profile in most of the metals which gain attention due to their bioavailable nature and susceptibility to release back to the water column in the entire zones of the estuary. Significant level of EXC and CA-bound fractions of Cd, Cu, Pb and Mn gain much attention due to their bioavailable nature and susceptibility to release back into the water column. The top section of the core mainly enriched with bioavailable fraction. High RAC and MF values were recorded at a few sampling sites suggesting that certain pockets of the CES are polluted by metals due to human influences and interferences. EF and KNRF revealed extreme contamination in these surface sediments.

10. **Akhil P S (2015)** “An Appraisal of Core Sediment Archives on Organochlorine Insecticides in a Tropical Estuary, India”. Cochin Estuary, one of the largest tropical estuary in India is facing gross pollution problems followed by the release of untreated effluents from industries and domestic sectors. It receives large inputs of terrigenous materials exported from land and autochthonous materials within the ocean. Therefore, understanding the nature and origin of these complex materials could provide valuable information regarding the anthropogenic pressures in this estuarine niche. Ecotoxicological assessments on surface sediments as well as deep sediment deposits are used to understand the complex relationship between contamination flux and fate of the pollutants in different compartments of the aquatic system. Biogeochemical evaluation of the study region revealed that organic matter in the sediments of CES is aged and the role of protein contribution as a potentially limiting factor for benthic consumers. Besides, the C/N ratio supports the allochthonous character of the sediments in the aquatic niche during the entire sampling periods and attributes a profound influence in the biogeochemical processes. In both the sampling periods, estimated chlorophyll-a to pheophytin value shows <1 in all the sediment cores, which indicates the prevalence of detritus matter in the sediments. The accumulation of detrital organic matter in sediment degrades the quality of organic constituents; limiting the benthic ecology and act as a potential carrier of toxic pollutants. Distribution of various organochlorine insecticides presented in this research work will constitute the first judicious baseline data set in both the surface and core sediments of CES. The following organochlorine insecticides were quantified under this investigation: α -

hexachlorocyclohexane (α -HCH), β -HCH, γ -HCH, heptachlor, aldrin, heptachlor epoxide (B), 4,4'-DDE, dieldrin, endrin, 2,4'-DDD, 4,4'-DDD, 2,4'-DDT, 4,4'-DDT, α -endosulfan, and β -endosulfan. Among these contaminants, cyclodienes followed by HCH and DDT compounds are the predominant OCIs in the study area. The high concentration of biologically degraded metabolite - p,p'-DDD of the parent DDTs shows that OCIs contamination was mainly from aged and weathered agricultural soils and was retained under anaerobic conditions in the sediment. The results also indicate that there exists a certain potential health risk to the habitat of the study area. The elevated concentration of OCIs in the CES is due to the direct discharge of partially treated or untreated industrial effluents into the river Periyar. Despite the restriction in use, the prevalent nature of OCIs in the core sediment reflects the illegal use, runoff from the tributaries, the persistent nature and the lipophilic character of these insecticides. The vertical distribution of these trace contaminants in the CES reveals an erratic pattern in all the sampling stations due to the varying environmental conditions prevailing in the CES. The study reveals that absolute comparability is difficult to achieve between the sediment cores taken within the same profundal zone in the estuary. Accumulation pattern cannot be expected to be uniform over the aquatic bed. As compared to first sampling campaign (2009), residual levels of OCIs and the concentration of organic matter were decreased during 2011 sampling period, particularly in the southern part of the estuary. Frequent dredging and sand mining in the CES leads to resuspension and redistribution of sediment bound contaminants, may be the reason for reduction OCIs in the aquatic niche. The present zone wise analysis would provide a better understanding of trace organics in the environment and could develop more effective strategies for protecting this vulnerable ecosystem from further pollution.

11. **Salas P M (2016)** The thesis entitled Provenance, Isolation and Characterisation of Organic Matter in the Cochin Estuarine Sediment-“A Diagenetic Amino Acid Marker Scenario” is an integrated approach to evaluate the source, quantity, quality, and degradation state of the organic matter in the surface sediments of Cochin estuarine system with the combined application of bulk and molecular level tools. Sediment and water samples from nine stations situated at Cochin estuary were collected in five

seasonal sampling campaigns, for the biogeochemical assessment and their distribution pattern of sedimentary organic matter. The organic matter in estuary comprise of a complex mixture of autochthonous as well as allochthonous materials. Autochthonous input is limited or enhanced by the nutrient elements like N and P (in their various fractions), used as a tool to evaluate their bioavailability. Bulk parameter approach like biochemical composition, stoichiometric elemental ratios and stable carbon isotope ratio was also employed to assess the quality and quantity of sedimentary organic matter in the study area. Molecular level charactersation of free sugars and amino acids were carried out by liquid chromatographic techniques. Carbohydrates are the products of primary production and their occurrence in sediments as free sugars can provide information on the estuarine productivity. Amino acid biogeochemistry provided implications on the system productivity, nature of organic matter as well as degradation status of the sedimentary organic matter in the study area. The predominance of carbohydrates over protein indicated faster mineralisation of proteinaceous organic matter in sediments and the estuary behaves as a detrital trap for the accumulation of aged organic matter. The higher lipid content and LPD/CHO ratio pointed towards the better food quality that supports benthic fauna and better accumulation of lipid compounds in the sedimentary environment. Allochthonous addition of carbohydrates via terrestrial run off was responsible for the lower PRT/CHO ratio estimated in the sediments and the lower ratios also denoted a detrital heterotrophic environment. Biopolymeric carbon and the algal contribution to BPC provided important information on the better understanding the trophic state of the estuarine system and the higher values of chlorophyll-a to phaeophytin ratio indicated deposition of phytoplankton to sediment at a rapid rate. The estimated TOC/TN ratios implied the combined input of both terrestrial and autochthonous organic matter to sediments. Among the free sugars, depleted levels of glucose in sediments in most of the stations and abundance of mannose at station S5 was observed during the present investigation. Among aldohexoses, concentration of galactose was found to be higher in most of the stations.

List of Ph.D Thesis Submitted

1. Gayathreedevi P K (2016) "A BREAKTHROUGH INVESTIGATION ON THE ASSESSMENT OF AEROSOL CONSTITUENTS IN THE REALM OF KOCHI".

No of Students Registered for Ph.D/ Research Programmes

Name	Area of Research Work
1. Dayala V. T	Molecular Approach for Environmental Chemistry.
2. Shibini Mol P.A	Ecotoxicological stress response of keystone species in distinct aquatic niche.
3. Eldhose Cheriyan	Isolation and constitutional characterization of biochemical descriptors from complex organic matter matrices in an estuarine depositional environment.
4. Dibu Divakaran	Molecular Approach for the study of DMS bacteria.
5. Nisa K G	Soil Microbial Analysis

6. Arsha Krishnan	Soil Chemistry
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No. of Ph.D Thesis Evaluated / Conducted

1. Vishnu Vardhan Kanuri (2012) “Biogeochemical cycling of dissolved organic matter in a river dominated ocean margin: Chilika Lagoon, India” , **Andhra University**.
2. V. Sri Ramkumar (2013) “Studies on biosynthesis and characterization of nanoparticles using seaweeds and their biological applications”, **Alagappa university**.
3. M. Esakkirajan (2014) “Studies on bioactive compounds isolated from *cassia auriculata* against colon cancer”, **Alagappa university**.
4. V. V. J. Gopala Krishna (2015) “Alkane And Photosynthetic Pigment Proxies Aided Reconstruction Of Biogenic Inputs And Phytoplankton Communities Near Equatorial Indian Ocean (3°N 77°E) During The Last 300 Kilo Years”, **Andhra University**.

Official Visit at Various Scientific Institutions

International (2013-2014)

1. RWTH Aachen University, Aachen, Germany: Collaborative Research Programme.
2. Leibniz Center for Tropical Marine Ecology, Bremen, Germany: Collaborative Research Programme.

National (2013-2014)

1. Alagappa University: To Conduct the Ph. D Viva- Voce Examination.
2. PRL, Ahmadabad: Project Outcome Presentation.
3. CESS, Trivandrum, Kerala, India: Research Committee Meeting.
4. NIO, Regional Centre, Cochin: Research Committee Meeting.

National (2014-2015)

1. Alagappa University: To Conduct the Ph. D Viva- Voce Examination.
2. CESS, Trivandrum, Kerala, India: Research Committee Meeting.
3. CMLRE, Cochin: Research Committee Meeting.
4. NIO, Regional Centre, Cochin: Research Committee Meeting.
5. NCAOR, Goa: For Arctic Expedition Theme Presentation.

National (2015-2016)

1. PRL, Ahmadabad: Project Outcome Presentation.
2. Andra University : To Conduct the Ph. D Viva- Voce Examination
3. NIO, Regional Centre, Cochin: Research Committee Meeting.
4. CESS, Trivandrum, Kerala, India: Research Committee Meeting.
5. CIFT, Cochin: Research Committee Meeting.
6. Annamalai University: Training Programme.

**Participation in Seminar/ Conference/Refresher courses etc by
Faculty/Students**

❖ **INTERNATIONAL**

- Participated in the training at Aachen University and ZMT Bremen, Germany in the topic entitled **“Latest analytical methods: Trace organic contaminants in marine sediments”** during October 17 to November 09' 2012.
- Presented a paper on **“Nutritional Quality of Cochin Estuary”** in the International Conference on Nutritional Medicine Health and Wellness organized by the Department of Zoology, St.Teresa's College, Ernakulum in collaboration with Dr. Rath Research Institute, USA, on 7th and 8th June 2012 at St.Teresa's College, Ernakulum.
- Paper presented in 5th International Symposium on **“Biological and Environmental Chemistry of DMS(P) and Related Compounds”**. Organized by National Institute of Oceanography (CSIR), on 19-22 October 2010 at **Goa, India**.
- Participated in Annual Science Conference 2010 Organized by International Council for the Exploration of the Sea (ICES) and presented a poster entitled **“Analysis and Identification of Biological production of Dimethyl Sulphide (DMS) and Dimethyl Sulphoniopropionate (DMSP) by Phytoplankton in the Cochin Estuarine System”** on 20-24 September at **Nantes, France**.
- Annual Science Conference 2010 Organized by International Council for the Exploration of the Sea (ICES) and presented a poster entitled **“Changes in Protein, Total Carbohydrate and Lipid in Marine Organism in Cochin Estuary”** on 20-24 September at **Nantes, France**.

❖ NATIONAL

- Participated in the UGC Sponsored National Seminar on “**Marine Biodiversity and Bioprospecting for Sustainable Livelihood (MBBSL 2016)**” organized by the Department of Marine Biology, Microbiology and Biochemistry, CUSAT on 21st & 22 March 2016.
- Participated in the National Seminar on “Green Technologies For Green Environment” and presented a paper entitled “**Significance of Volatile Sulfide Gas Emissions and its Impacts on Climate Change: A Case Study in Cochin Estuary, Kerala, India**” under the aegis of University Grants Commission, New Delhi on 3rd & 4th December 2015 at Department of Chemistry, Sreenarayana Mangalam College, Maliankara, Ernakulam, Kerala, India.
- Participated and successfully completed the Short Term training on “**Integrated Coastal Zone management-ICZM 2015**” organized by Department of Earth Sciences, Annamalai University at Chidambaram, Chennai during 2-6 November 2015.
- Participated in the National Workshop on “**Changing Atmospheric Composition and its Role in Modulating Climate Change**” organized by the Department of Atmospheric Sciences, CUSAT sponsored by Kerala State Higher Education Council and Department of Environment & Climate Change, Govt. of Kerala on 16th November 2015.
- Participated in the National Conference on Analytical Science and Technology-2015, and presented four posters entitled “**Distribution Pattern of Trace Organic Contaminants in the Cochin Estuarine System (CES) India: An Overview**” , **Recent Insight on Biogeochemical Constituents in the Cochin Estuarine System (CES)**, “**Detection and Identification of Dimethyl Sulfoniopropionate (DMSP) in Phytoplankton sps.**”, and “**Assessment of Organochlorine Contamination in Surface Soil of Palakkad District, Kerala, India**” held during 24-26 September 2015 at, **Munnar**, Kerala, India, organized by Indian Society of Analytical Scientists Kerala Chapter (ISASK).
- Participated in National Conference of Ocean Society of India (OSICON’13) and presented two papers entitled “**Characterization of Organic Matter in the core sediments of Cochin Estuarine System**” and “**Geochemical Assessment of Metal contamination in the Core Sediments of Cochin Estuarine System**” held during 25th November to 28th November 2013 at Indian Institute of Tropical Meteorology, Pune, India.

- Presented a paper on “**Geochemical Characteristics of Sediment core Pore water Particulate matter from Cochin Estuary**” in the National seminar **Aquasem’13** on Recent Developments in Water Chemistry with Specific Reference to Water Resources and Management organized by the Department of Chemical Oceanography CUSAT, Society of Aquatic Chemists Kochi on 21 – 23 March 2013.
- Paper presented in Regional Seminar on “ Water Quality Assessment and Management of Kerala State” “ **Soil Geochemical Facsimile of Kasargod District with special reference to Ground water Quality**” held during 5-6 February 2013 organized by National Institute of Hydrology, at Trivandram, Kerala.
- Participated in National Conference of “Mangrove wetlands and near shore marine ecosystems :from sustainability issues to management & restoration” and presented a poster entitled “ **Suspended Particulate matter and Trace gas signature of the Metropolitan city, Cochin**” held during 5-6th March 2012 at Jawaharlal Nehru University, **New Delhi**, India.
- Participated in National Conference of “Mangrove wetlands and near shore marine ecosystems :from sustainability issues to management & restoration” and presented a paper entitled “**Core Sediment Biogeochemistry in specific zones of Cochin Estuarine System(CES)**” held during 5-6th March 2012 at Jawaharlal Nehru University, **New Delhi**, India.
- Participated in National Conference of “Mangrove wetlands and near shore marine ecosystems :from sustainability issues to management & restoration” and presented a paper entitled “**Core Sediment Metal Distribution in Prominent areas of Cochin Estuary**” held during 5-6th March 2012 at Jawaharlal Nehru University, **New Delhi**, India.
- Presented a paper on “**Contribution of women in improving the quality of the environment –A general perspective**” in the National seminar on Role of Women in the protection and promotion of Environment held at the Women’s Studies Centre,CUSAT,Kochi 22 on 8th March 2011.

- Participated in National Conference of Ocean Society of India (OSICON'11) and presented a paper entitled “ **The Distribution of REE's along South coast of India** ” held during 13-15 July 2011 at National Institute of Ocean Technology, **Chennai**, India.
- Participated in National Conference of Ocean Society of India (OSICON'11) and presented a paper entitled “**Environmental factors controlled by phytoplankton biomass and production rate in the estuarine waters off Cochin** ” held during 13-15 July 2011 at National Institute of Ocean Technology, **Chennai**, India.
- Participated in National Conference of Ocean Society of India (OSICON'11) and presented a paper entitled “**Seasonal Trends in the Aerosol Components Over the Cochin Estuarine system** ” held during 13-15 July 2011 at National Institute of Ocean Technology, **Chennai**, India.
- Participated in National Conference of Ocean Society of India (OSICON'11) and presented a paper entitled “ **Spatial and Vertical Transmission pattern of Pigments and their Assimilation with Nutrients in the Southern Ocean Water Mass**” held during 13-15 July 2011 at National Institute of Ocean Technology, **Chennai**, India.
- Participated in National Conference of Ocean Society of India (OSICON'11) and presented a Paper entitled “**Core Sediment Organic Matter Distribution in the Coastal Region of Antarctica**” held during 13-15 July 2011 at National Institute of Ocean Technology, **Chennai**, India.
- Participated in “**National Seminar on biodiversity**” Organized by Swadeshi Science Movement on 17 December , 2010 at School of Marine Sciences, CUSAT, Kochi,**Kelala**,India.
- Presented a paper on **Biogeochemistry of sediment organic matter in selected stations of Kerala coast** , Symposium on Indian Ocean Marine Living Resources (**IndoMLR**)organized by Centre for Marine living resources and ecology on 2nd and 3rd December 2010 at **Ernakulam, Kerala, India**.
- Participated in National Seminar on “**Chemistry and Environment**” and presented a paper entitled “**Groundwater Quality Assessment in Selected Areas in Mattancherry of Cochin Corporation, Kerala, India**” conducted by St. Poulos College on 2-4 September 2010, at **Ernakulam, Kerala, India**

- Presented a paper on **Distribution of sediment organic matter (Protein & Lipid) in selected stations of Kerala coast** in Kerala's 1st Women Science Congress held at St. Theresa's College Ernakulam From 10-12 August 2010.
- Presented a paper entitled "**Accumulation rate of Sodium and Potassium ions in Bivalve mollusc relevant to their concentration in biota of Cochin Estuary**" in the 1st Kerala Women's Science congress-2010
- Participated and successfully completed the Short Term training on "**Isotope Tracer Techniques for Water Resources Development and Management**" organized by Centre for Water Resources Development and Management (CWRDM) at Kunnamangalam, Kozhikode. Under the aegis of Department of Science and Technology, Government of India during 21-26 June 2010.

Last modified: 08.08.2016