BIO DATA of Dr. Sajeevan T.P.

Basic Details

Name: Dr.Sajeevan T.P

Designation : Assistant Professor

Department: National Centre for Aquatic Animal Health Institute/university : Cochin University of Science and Technology

Date of Birth : 16-01-1976 SC/ST : No Gender : Male

Education Details

Education (Post-graduation onwards & Professional Career)

Sr. No	DEGREE AWARDED	INSTITUTION/PLACE	YEAR	FIELD OF STUDY
	M.Sc	Cochin University of Science	1999	Marine Biology
1		and Technology		
2	PhD	Cochin University of Science	2005	Marine
		and Technology		Microbiology

Employment Details

Position and Employment (Starting with the most recent employment)

Sr. No.	INSTITUTION/PLACE	DESIGNATION	FROM DATE	TO DATE
1	Cochin University of Science and	Associate	01-06-	Present
	Technology, National Centre for	Professor	2021	date
	Aquatic Animal Health			
	Cochin University of Science and	Assistant	23-07-	31-05-
2	Technology, National Centre for	Professor	2010	2021
	Aquatic Animal Health			
3	University of Texas Southwestern	Postdoctoral	09-11-	31-09-
	Medical Center, Dallas, Texas, USA	Researcher	2016	2017
4	Center for Marine Biotechnology	Visiting	01-05-	29-05-
	and Biomedicine, Scripps	researcher	2016	2016

	Institutions of Oceanography, University of California, San Diego, USA			
5	Mar Athanasius College ,	Assistant	01-6-2009	22-07-
	Kothamangalam, Ernakulam	Professor		2010
6	Rajiv Gandhi Centre for	CSIR -	1-3-2009	30-5-2009
	Biotechnology, Trivandrum	Research		
		Associate -		
7	Ministry of Fisheries wealth,	Scientist-II	24 -1-2006	15-12-
	Sultanate of Oman.			2008
8	Dept. of Marine Biology ,	Lecturer on	24-3-2004	15-01-
	Microbiology and Biochemistry ,	Contract		2006
	Cochin University of Science and			
	Technology,			

Award/Honors Details

A) International : Three

- 1. UGC-Raman postdoctoral fellowship to do advanced research at the University of Texas, Southwestern Medical on the topic "Isolation and chemical characterisation of anticancer metabolites from marine actinomycetes and elucidation of mechanisms of anticancer activity through Functional Signature Ontology (FUSION) mapping" under the supervision of Dr. John MacMillan, Dept. of Biochemistry, University of Texas Southwestern Medical Centre, Dallas, Texas, USA.
- Visiting Researcher at Scripps Institutions of Oceanography, University of California, San Diego, USA as part of Indo-US 21st Century Knowledge Initiative programme of UGC, Govt of India
- 3. Expedition member in the 'Indian Arctic Expedition 2014' (June 21- July 28) and spent 36 days at Indian Arctic station "Himadri", and studied the Arctic Microbial Diversity

B) National : Three

1. Appreciation award from CUSAT 2018

2. II Rank in M.Sc. Marine Biology from Cochin University of Science and Technology 3. Research Associateship (CSIR) : For the project Development of an *In Vitro* NS3 protease assay and screening of marine metabolites for potential anti-dengue virus activities.

Professional Experiences and Training relevant to the project:

Dr T.P. Sajeevan has 16 years of research experience in marine biotechnology and marine bioprospecting for bioactive compounds. In 2010 Sajeevan started his career as an Assistant professor in Marine biotechnology at NCAAH, CUSAT and started a marine bio-prospecting research wing for marine drug and bio-discovery at NCAAH CUSAT. In October 2016, he was awarded the prestigious UGC- Raman Fellowship for Post-Doctoral Research in the USA for one year. During his postdoctoral research under the supervision of Prof. John B MacMillan, Dept.of Biochemistry at University of Texas Southwestern Medical Centre, Dallas, USA, he got in-depth training in isolation and characterization of marine anticancer and bioactive metabolites from marine actinomycetes using various chromatographic techniques, including HPLC, Flash chromatography, LC-MS, High-resolution tandem mass spectroscopy (LC-MS/MS) and NMR. In early 2016 he served as s a visiting researcher at Centre for Marine Biomedicine and Biotechnology, Scripps Institutions of Oceanography (SIO), University of California at San Diego, USA, where he got trained in cutting edge open-source GNPS platform for targeted discovery of novel metabolites with biomedical applications. Dr Sajeevan has participated in many sea cruises, including arctic expedition (36 days) and collected marine samples from the different marine environments. As an outcome of many research projects, he maintains a very good collection of marine microorganisms, sponges and ascidians with potential activities and further ongoing work. Recently his group discovered and described a novel bacterial genus, Roseitranguillus sediminis (Umar et al 2021), and a novel species of rare actinomycetes with cytotoxic activities, Pseudonocardia cytotoxica (Dhaneesha et al 2021) from Arctic fjord and both discoveries were published in Antonie van Leeuwenhoek Journal for microbiology. As part of the Indo-US 21st century knowledge initiative programme, funded by University Grants Commission, a National Consultation on Pharmaceuticals and Bio-fuel from Marine Biological Systems was organized at NCAAH, CUSAT, jointly with DBT, Government of India and Scripps Institutions of Oceanography, California, USA (February 2016). The three-day National Consultation ended with identifying the Marine Pharmaceuticals for Human medicine and aquatic animal health are the major flagship programmes to be undertaken for future research. To take the mission forward it has been decided to establish a NATIONAL FACILITY FOR MARINE **EXTRACTS AND GENETIC RESOURCES FOR BIOACTIVE MOLECULES (NFME & GRBM)** at NCAAH, Cochin University of Science and Technology, Cochin, under the leadership of Dr.Sajeevan. Accordingly, NATIONAL FACILITY FOR MARINE **EXTRACTS AND GENETIC RESOURCES FOR BIOACTIVE MOLECULES (NFME &** GRBM) was established in June 2019.

Dr Sajeevan is currently guiding 5 PhD students on various aspects of marine bioprosepecting, and three PhDs were awarded under his guidance. Dr.Sajeevan has completed four major research projects funded by various funding agencies. The results of this research were published in reputed international journals with high impact factor (Dhaneesha et al., 2017,2019,2021 Sivakumar et al. 2016, 2020, Umar et al; 2021). He successfully developed active research collaborations with many international Scientists, including researchers from Scripps Institutions of

Oceanography, California, USA; Tel Aviv University, Israel, Ningbo University, China, Simon Fraser University, Canada and University of California at Santa Cruz, USA.

Publications											
A) B) Go Lis	A) International : 26 B) National : 3 Google Scholar index : <u>h-index</u> 13 <u>i10-index</u> 14 List of Publication in the peer reviewed Journals										
Sr. No.	TITLE OF PAPER	AUTHORS	REFERENCE OF JOURNAL	YEA R OF PUB LICA TIO N	IMPA CT FACT OR						
1	Folate Functionalized Chitosan Nanoparticles as Targeted Delivery Systems for improved anticancer efficiency of Cytarabine in MCF -7 human breast cancer cell lines	Deepa G, Anoop B. S, Krishnapriya R.S, Dhaneesha M, Jisha V.S, Sajeevan T.P	Internationa I Journal of Biological Macromolec ules,	(acce pted)	6.95						
2	Roseitranquillus sediminis gen. nov., sp. nov. a novel genus and species of the family Rhodobacteraceae, isolated from sediment of an Arctic fjord	Md. Umar, Krishnan K.P, . Rupesh Kumar Sinha, Thasreefa K. Merlin T.S, Jeslin IJ Valsamma Joseph Sajeevan T.P	Antonie van Leeuwenhoe k. Dec;114(12) :2147-2162	2021	2.271						
3	<i>Pseudonocardia cytotoxica sp. nov.,</i> a novel actinomycete isolated from an Arctic fjord with potential to produce cytotoxic compound.	Dhaneesha,M, Md Umar, T.S Merlin, K.P Krishnan, Vrinda S, Rupesh Kumar Sinha Abdulaziz Anas, Peng Fu, John B MacMillan, Sajeevan , T.P ,	Antonie van Leeuwenhoe k. Jan;114(1):2 3-35	2021	2.271						
4	Challenges and prospects of Viral Envelope protein VP28-based control strategies to combat white spot syndrome virus in penaeid shrimps: a review	Sivakumar K.C, T.P.Sajeevan .	Reviews in Aquaculture (13), 734– 743	2021	10.59 2						
5	Applying a Chemogeographic Strategy for Natural Product Discovery from the Marine	Christopher A. Leber, C. Benjamin Naman, Lena Keller, Jehad Almaliti, Eduardo J. E.	Marine Drugs 18(515):1-25	2020	5.118						

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	Cyanobacterium Moorena bouillonii	Caro-Diaz, Evgenia Glukhov, Valsamma Joseph, T.P. Sajeevan , Andres Joshua Reyes, Jason S. Biggs, Te Li, Ye Yuan, Shan He, Xiaojun Yan, and William H. Gerwick			
6	Prospects of multitarget drug designing strategies by linking molecular docking and molecular dynamics to explore the protein– ligand recognition process.	Sivakumar K.C, Jin Haixiao,C. Benjamin Naman, T. P. Sajeevan,	Drug Development Research,81(6): 685-699	2020	4.360
7	Endophytic Fungi Isolated from the Marine Sponges as a Source of Potential Bioactive Compounds	Lekshmi, N , Umar, MD, Dhaneesha, M, Rojin Joseph, Ravinesh, R. and Sajeevan, T.P.	Journal of Aquatic Biology & Fisheries (8) pp. 63-71	2020	
8	A systematic review of recently reported marine derived natural product kinase inhibitors	Li, T.; Wang, N.; Zhang, T.; Zhang, B.; Sajeevan, T.P. ; Joseph, V.; Armstrong. L.; He, S.; Yan, X.; Naman, C.B.	Marine Drugs. 17, 493-	2019	5.118
9	DNA binding and molecular dynamic studies of Polycyclic Tetramate Macrolactam (PTM) Antibiotics With Potential Anticancer Activity Isolated From A Sponge Associated <i>Streptomyces zhaozhuensis</i> subsp. <i>mycale</i> subsp. nov.	Dhaneesha,M, O. Hasin , K.C. Sivakumar , R. Ravinesh, C.BNaman, S. Carmeli , T.P. Sajeevan	Marine Biotechnolo gy Feb;21(1):12 4-137	2019	3.619
10	Molecular Simulation and <i>In Vitro</i> Evaluation of Chitosan Nanoparticles as Drug Delivery Systems for the Controlled Release of Anticancer Drug Cytarabine against Solid Tumors	Deepa. G, Sivakumar K. C. and Sajeevan T. P	3Biotech Dec;8(12):49 3	2018	2.406
11	A novel solvent tolerant esterase of GDSGG motif subfamily from solar saltern through metagenomic approach:Recombinant expression and characterization.	Jayanath,G. Sowmya P. Mohandas, Bhavya Kachiprath, Solly Solomon, T.P. Sajeevan, I.S. Bright Singh, Rosamma Philip	Internationa l Journal of Biological Macromolec ules,119:393 -401	2018	6.953
12	Oxidative Stress and Antioxidant Defense Responses of <i>Etroplus</i> <i>suratensis</i> to acute Temperature	Susan Joy, Aneesa P A, Jisha Jose, Hari S, H, Prabhakaran	J.Therm Biol. Dec;70(Pt B):20-26	2017	2.902

	Fluctuations.	Meethal Parambath, Sajeevan T.P and			
13	Effect of Acute Thermal Stress on Carbohydrate and Lipid Profile in <i>Etroplus suratensis.</i>	Babu Philip Susan Joy, Aneesa Painadath Alikunju, Jisha Jose, Sajeevan T.P, Babu Philip.	Indian Journal of Geo Marine Scien	(in pres s)	0.328
14	Streptomyces artemisiaeMCCB 248 isolated from Arctic fjord sediments has unique PKS and NRPS biosynthetic genes and produces potential new anticancer natural products.	Dhaneesha M, C.B.Naman K. P. Krishnan, Rupesh Kumar Sinha, P.Jayesh, Valsamma Joseph, I. S. Bright Singh, W.H. Gerwick, T. P. Sajeevan	28 3Biotech 7(32) 1-10	2017	2.406
15	Molecular Characterisation of a Novel Isoform of Hepatic Antimicrobial Peptide, Hepcidin (<i>Le</i> -Hepc), from <i>Leiognathus</i> <i>equulus</i> and Analysis of Its Functional Properties In Silico.	Aishwarya Nair, K. S. Sruthy,E. R. Chait hanya, T. P. Sajeevan , I. S. Bright Singh,Rosamma Phili p	Probiotics Antimicrob Proteins. Dec;9(4):473 -482	2017	4.609
16	Marine-derived compounds as binders of the White spot syndrome virus VP28 envelope protein: In-silico insights from molecular dynamics and binding free energy calculations.	Sivakumar, Sajeevan T.P, I.S.Bright Singh	Computation al Biology and Chemistry. 64 359–367	2016	2.877
17	High-quality metagenomic DNA from marine sediment samples for genomic studies through a preprocessing approach.	Solly Solomon, Bhavya K, G. Jayanath, T. P. Sajeevan, I. S. Bright Singh, Rosamma Philip	3Biotech, 6(2), 1-5	2016	2.406
18	Apoptosis Mediated Anticancer Activity of <i>Streptomyces sp. MCCB</i> 248 Isolated from an Arctic Fjord, Kongsfjorden, Svalbard, on NCI- H460 Human Lung Cancer Cell Line	Dhaneesha M, Sajeevan T.P, K.P.Krishnan, Bright Singh I.S.	Marine Drugs. 13(12) 7171	2015	5.118
19	Differential expression of antimicrobial peptides in <i>Penaeus monodon</i> in response to the administration of marine yeasts β Glucans and white spot virus challenge	Swapna P. Antony, Rosamma Philip, Sajeevan T.P ., Simi Joseph P., and Bright Singh I. S.	Blue Biotechnolo gy, Vol.1 (1) 69-90.	2012	
20	Marine yeast diet confer better protection than its cell wall	Sajeevan,T.P.,Douglas W. Lowman, David L.	Aquaculture Research40,	2010	2.082

	component (1-3)-β-glucan as	, Williams ,S.Selven ,	1723-1730		
	immunostimulant in	A.Anas and			
	Fenneropenaeus indicus.	Rosamma Philip .			
21	Beta-Mercapto-ethanol- treated	Sajeevan,T.P. Selvan	Aquaculture	2010	2.082
0	yeast showed better protection	S, Rosamma Philip	Research		
	against white spot syndrome		41, e715-		
	virus infection in Indian white		e718		
	shrimp Fenneropenaeus indicus				
22	Marine yeast glucans confer	Vrinda Sukumaran,	Aquaculture	2010	2.082
	better protection than that of	Douglas W Lowman,	Research,41,		
	baker's yeast in Penaeus	T.P Sajeevan.,	1799-1805		
	monodon against white spot	Rosamma Philip			
	syndrome virus infection.				
23	Comparative efficacy of MS-	P.K Pramod,	Aquaculture	2010	2.082
	222and Benzocaine as	A.Ramachandran,	Research,		
	anaesthetics during simulated	T.P.Sajeevan , Sunesh	41, 309-314		
	transport conditions of a tropical	Thampy, S. Somnath			
	ornamental fish <i>Puntius</i>	Pai.			
	filamentosus (Valenciennes).				
24	Effects of Two Anesthetics on	Pramod, P.K . T. P.	North	2010	1.717
	Water Quality during Simulated	Sajeevan, A.	American		
	Transport of a Tropical	Ramachandran and	Journal of		
	Ornamental Fish, the Indian tiger	Sunesh Thampy, S	Aquaculture		
	barb Puntius filamentosus.	Somnath Pai	72:290-297		
25	Study on <i>Cochlodinium</i>	Kazumi Matsuoka,	Current	2010	-
	polykrikoides Margalef	Yoshihito Takano,	Development		
	(Gymnodiniales, Dinophyceae) in	Ehsan Kamrani,	in		
	the Oman Sea and the Persian	Hamid Rezai,	Oceanograp		
	Gulf from August 2008 to August	Sajeevan T P,	hy 1 (3) 153-		
	2009.	Hamed Mohammed	171)		
		Al Gheilani			
26	Effect of treatment with Beta-1.3	Sajeevan, T.P. and	J. Marine	2009	
	glucan from the yeast <i>Candida</i>	Rosamma Philip	Biological		
	sake S165 on protection to		Association		
	<i>Fenneropenaeus indicus</i>		of India 51		
	postlarvae against WSSV		(2) 227-230		
	infection.				
27		Sajagyan T.D	Aquaculture	2000	1.212
21	Dose/frequency: A critical factor	Docommo Dhilin and	797 710	2009	4.242
	in the administration of glucan as	IS Bright Singh	207 240-		
	immunostimulant to Indian white		2.32		
	shrimp Fenneropenaeus indicus.				
28		Abdulaziz Anas	Aauaculture	2009	2.082
20	Alkali insoluble glucan extracted	Douglas W Lowman	Research	_007	
	trom Acremonium diospyri is a	David L Williams	40. 1320-		
	more potent immunostimulant in	Stewart Millen S	1327		
	the Indian White Shrimp,	Somnath Pai T P			
	<i>Fenneropenaeus indicus</i> than	Sajeevan, Rosamma			
	alkali soluble glucan.				
				_/	

		Philip & I S Bright			
		Singh			
29	Immunostimulatory effect of a	Sajeevan,T.P.	Aquaculture	2006	4.242
	marine yeast <i>Candida sake</i> S165	Rosamma Philip and	257,151-155		
	in Fenneropenaeus indicus	I.S. Bright Singh.			
		0 0			

Book Chapters Published : 3 nos

		Proje	ct Details					
Lis	st of ongoing projects in	which the a	applicant	has a rol	e of PI/	Co-PI		
Sr. No.	TITLE OF PROJECT	FUNDING AGENCY	FROM DATE	TO DATE	No of SCIEN TISTS UNDE R THE PROJ ECT	TOTAL APPRO VED COST (RS in Lakhs)	ROL E OF APP LICA NT	CURR ENT STAT US OF PROJ ECT
1	EstablishmentofFunctionalGenomicsandMetabolomicsPlatformforAugmentedProductionofAquaticBio-Bio-ResourcesandDiscoveryofMoleculesofBiomedical Importance	Higher Education Departme nt, Govt. of Kerala	25/10/ 21	24/10/ 22	6	372.43	PI	Appr oved
2	Bioprospecting for Neuroprotective compounds from an endosymbiotic fungi Aspergillus sp. MCCF102 isolated form a marine sponge as potential drug candidates against neurodegenerative disorders	DBT, Govt.of India	22/02/ 2019	21/02/ 2022	2	53.886	PI	On Going
3	Integrated genomic and metabolomic approach for the discovery of novel small molecules with anticancer activity	DBT, Govt.of India	28/10/ 2021	27/10/ 2024	3	83.041 6	PI	On Going

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	from marine microorganisms								
4	Microbiome of Glaciomarine system of Svalbard; diversity and its variability.	Ministry of Earth Sciences	05/07 2019	2 02 20	4/07/ 022	3	40.843	CO- PI	On Going
5	Establishment of Bioinformatics and Computational Biology Centre for Marine Bio- resource Conservation and Sustainable Utilization	DBT, Govt. of India	22/02 21	21 22	1/02/ 5	6	74.99	CO- PI	On going
Lis	st of Completed Project	in which the	e applio	cant h	nas a ro	le of PI/	′ Co-PI		1
Sr. No	. TITLE OF PROJECT	FUND G AGEN	DIN F D CY	ROM ATE	TO DATE	No.OF SCIEN TISTS UNDE R THE	TOTAL APPRO ED COS (RS in Lakhs)	RC V OF ST Ap nt	DLE pplica

No.		G AGENCY	DATE	DATE	TISTS UNDE R THE PROJ ECT	ED COST (RS in Lakhs)	Applica nt
1	Bioprospecting for antitumor molecules from marine actinomycetes	UGC	7 th June 2012	6 th June 2014	1	3.83	PI
2	Bioactive peptides and Depsipeptides with potential anticancer activity from marine sponges and tunicates of Indian Ocean	Kerala State Council for Science, Technolo gy and Environ ment	16- 09- 2015	15- 09- 2018	1	24.45	PI
3	Molecular screening, cell culture based isolation and characterization of finfish and shellfish viruses and establishment of National Repository	DBT, Govt.of India	09/7/ 2017	08/0 7/20 20	4	118.66	PI
4	Isolation and chemical characterisation of	UGC, under	09- 11-	31- 09-	1	USD 37200/+	PI

	anticancermetabolitesfrommarineactinomycetesandelucidation of mechanismsanticanceractivitythroughFunctionalSignatureOntology(FUSION) mapping	Raman Fellowsh ip for Post Doctoral Research in USA	2016	2017		Rs 50,000/-	
5	Nutritional evaluation, segregation and production optimization of novel marine microalgae for establishment as live feeds in fish and shellfish culture	DBT, Govt. of India	20/6/ 2018	19/6/ 2021	2	70.912	Co- investi gator
6	Marine synthetic biology: building national capacity and human resources	DBT, Govt. of India	28/1 2/20 17	27/1 2/20 20	4	51.49	Co- investi gator
7	Indo-US initiatives on innovative reforms in marine biotechnology education and research and development of sustainable aquaculture production systems for inclusive economic growth and sustainable development (as one of the Investigators)	Universit y Grants Commiss ion, Govt. of India (under the Indo- US 21 st Century Knowled ge Initiative)	01.08. 2015	31- 07- 2018	3	125.29	Co-PI

Doctoral Works Supervised: 4

Sl. No	Name of candidates and Register numbers	Title of the Ph. D. thesis	Year of award of degree
1	Dhaneesha M	Marine Isolates <i>Streptomyces</i> sp.	2018
	(Reg.No: Reg. No. 4404	MCCB 267 and <i>Pseudonocardia</i> sp. MCCB 268 as source of Potential Anticancer Molecules Ikarugamycin	

		Type Polyketides and 1-Acetyl-β- Carboline: Isolation, Purification and <i>in vitro</i> Evaluation of Anticancer Activity	
2	Susan Joy (Reg. No. 4185) (Co- Guide)	Biochemical effects of thermal stress in a tropical teleost fish <i>Etroplus</i> <i>suratensis</i> (Bloch, 1790)	2019
3	Sivakumar K.C(Reg. No. 4847)	Structure based in silico screening for antiviral lead compounds from marine sources against White Spot Syndrome Virus: A multi-target drug discovery approach	(submitted)
4	Lekshmi N (Reg. No. 4661)	Sponge associated fungus <i>Aspergillus</i> <i>tamarii</i> MCCF 102 is a potential source of the anti-inflammatory dipyrrolobenzoquinones Terreusinone and Terreusinone B for neuroprotective drug development	2021

Ongoing Doctoral Programmes

Sl.	Name of candidates	Title of the Ph. D. thesis	Current
No	and Register numbers		Status
1		Development of Polymer based	(Thesis
	Deepa G	Nanoparticle of Marine Derived	submitted)
		Anticancer Drugs for Targeted	
		Delivery and Reduction of Toxicity	
2	Merlin T.S	Ascidians of Indian coast; Diversity,	(Thesis
		Biology, Ex-situ and In vitro	writing)
		propagation	
3	Krishna Priya R.S	Immunoprophylactic measures to	(Thesis
		alleviate stress induced mortality in	writing)
		Asian Seabass (Lates calcarifer)	
4	Md Umar	Cultural based study of Arctic	Work on
		Microbial Diversity,	going
		characterization, phylogeny and	
		their Bioprospecting potential	

M.Tech Projects Supervised: 15Nos

Presentations which won Awards/Prizes

Best paper Oral presentation award:- Krishna Priya R S, Avinash Premraj, Sajeevan T P. 'Isolation and molecular characterization of Interferon Stimulated

gene (ISG)-15 from *Lates calcarifer" at* National conference on Future Trends in Marine Biotechnology (FTMBT 2019) held on 14-15th February 2019 at Vivekananda Kendra Kanyakumari organized by Manonmaniam Sundarnar University, TamilNadu

Best Paper Award in Life science - Dhaneesha M, Sajeevan T.P Anticancer Activity of Sponge Associated Actinomycetes *Streptomyces* sp. MCCB267 On Lung Cancer Cell Line. In: Proceedings: 28th Kerala Science congress. University of Calicut, 2016

Best Oral Presentation Award - Dhaneesha M, Shmuel Carmeli, I.S.Bright Singh, Sajeevan T.P A New Polycyclic Tetramate Macrolactam (PTM) Antibiotic With Potential Anticancer Activity Isolated From A Sponge Associated Actinomycetes *Streptomyces* sp. MCCB267. In: Proceedings: UGC Sponsored National Seminar on Marine Biodiversity and bioprospecting for sustainable livehood. Cochin University of Science and Technology, Cochin, 2016

GenBank Submissions (www.ncbi.nlm.nih.gov) : 120 Nos and 5 Whole genome Submission