

CURRICULUM VITAE

1. Name : N.M. Sachindra
2. Date of Birth : 23 July 1961
3. Nationality : Indian
4. Address : Senior Principal Scientist
Meat & Marine Sciences
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6. Education Details

Sl No	Institute	Certificate/ Degree	Year	Subject	% Marks/ CGPA
1	College of Fisheries Mangalore	B.F.Sc	1984	Fisheries Sciences	3.69/4.00 (93.8%)
2	College of Fisheries Mangalore	M.F.Sc.	1986	Industrial Fishery Technology	3.95/4.00 (99.0%)
3	University of Mysore	Ph.D	2004	Food Science	
4	Hokkaido University, Japan	Post-Doctoral	2005 - 2007	-	-

7. Professional Experience

Sl.no	Designation	Institute/Organisation	Period
1	Junior Merit Teaching Fellow	College of Fisheries Mangalore, India	Jan 1987 – Dec 1987
2	Trainee Technologist	Rallies India Ltd Mumbai	Jan 1988 – March 1989
3	Scientist	CFTRI, Mysore India	Since May 1989

8. Research Experience:

Twenty seven years in Fish Processing Technology/marine biotechnology and 14 years in Meat Microbiology and Meat Technology. Worked / working in the areas of ensilaging of shrimp waste; decontamination of meat; carotenoids from marine source; shark fin rays; fish feeding and related growth studies; Value addition to fish/shrimp waste; enzymes from fish waste; collagen from fish waste/egg shell membrane; antioxidants from marine source; biofunctions of marine carotenoids; bioactive molecules from seaweeds. Has successfully worked on the recovery and characterization of polyphenols and polysaccharides and published many research papers in peer-reviewed journals. Present research interests include: marine bacterial carotenoids – isolation, characterisation and elucidation of biosynthesis mechanisms; novel enzymes from marine bacteria – isolation, characterisation, cloning and expression of genes

encoding for production of novel enzymes; nutraceutical and functional food ingredients from marine resources – Antioxidants, immunostimulatory, antihypertensive and antihyperlipidemic compounds; development of multiplex PCR for detection of meat borne pathogens; prevention of post-harvest fish losses using bio-preservatives; quorum sensing inhibitors from marine sources for food preservation; molecular characterisation of antibiotic resistance bacteria from poultry, seafood flavors

9. Publications

Patents	: 10 (granted 5)
Book Chapter	: 14
Reviews	: 2
Research papers published	: 57
Presented in symposia/ conferences	: 61

Patents (Granted)

1. **Sachindra NM**, Bhaskar N, Sakhare PZ, Mahendrakar NS and Narasimha Rao D 2001. An improved process for recovery of carotenoids from crustacean waste (Indian Patent 95 / DEL / 2001 dtd 31 Jan 2001)
2. **Sachindra NM**, Bhaskar N, Yashoda KP and Narasimha Rao D 2002. An improved method for extraction of finrays from dried shark fins. (Indian Patent No. 192738/15.05.2004)
3. Bhaskar N, **Sachindra NM**, Mahendrakar NS, Sakhare PZ and Narasimha Rao D 2002. An improved process for preparation of proteolytic activity rich spice powder and its application for tenderization of meat (Indian Patent No. 192737/15.05.2004)
4. **Sachindra NM**, Sakhare PZ, Puttarajappa P and Narasimha Rao D 2003. An improved chicken soup mix composition and a process for preparing the same. (Indian patent No. 227708; US patent No. 7255889/14.08.2007)
5. **Sachindra NM** and Mahendrakar NS 2010. A process for preparation of carotenoid formulation useful for coloration of fish products. Indian Patent No.IN 243672/05.11.2010

Book Chapters

1. Rao DN, **Sachindra NM**, Bhaskar N, Sakhare PZ and Puttarajappa P 2005. Meat Preservation In. *Elements of Veterinary Public Health*. (Ed). Sherikar AT, Bachhil VN and Thapliyal DC. ICAR, New Delhi
2. **Sachindra NM**, Hosokawa M and Miyashita K 2007. Biofunctions of marine carotenoids. In. *Biocatalysis and biotechnology for functional foods and industrial products*. (Ed). Hou CT and Shaw J, CRC Press, NY. Pp. 91-110
3. **Sachindra NM**, Bhaskar N and Mahendrakar NS 2010. Carotenoids in commercially important crustaceans from Indian marine waters. In. *Compendium of bioactive natural products* (Ed) Gupta VK, Studium Press, LLC, USA, pp. 175-189.
4. **Sachindra NM**, Bhaskar N, Hosokawa M and Miyashita K 2010. Value addition to seafood processing waste. In. *Handbook of seafood quality, safety and health applications*.

- (Eds). Alasalvar C, Shahidi F, Miyashita K and Wanasundara U. Wiley-Blackwell Publishing. Pp. 390-401
5. Bhaskar N and **Sachindra NM** 2010. Role of biotechnology in recovery of bioactive components from seafood industry byproducts. In: *Current topics on bioprocesses in food industry* (Ed) Rao LV, Pandey A, Larroche C, Soccol CR and Dussap CD, Asiatech Publishers, New Delhi, pp 105-117.
 6. Swapna HC, Amit K Rai, **Sachindra NM** and Bhaskar N 2010. Seafood enzymes and their potential industrial application. In: *Handbook of seafood quality, safety and health applications*. (Eds). Alasalvar C, Shahidi F, Miyashita K and Wanasundara U. Wiley-Blackwell Publishing. Pp. 522-535
 7. Bhaskar N, **Sachindra NM**, Suresh PV and Mahendrakar NS 2010. Microbial reclamation of fish industry by-products. In: *Aquaculture Microbiology and Biotechnology*, Montet, D. & Ray, R.C. (eds), Sci Publishers Inc., Enfield, NH, 249-275.
 8. Sowmya R and **Sachindra NM** 2011. Carotenoids in aquatic resources: Occurrence, recovery, application and biofunctions. In: *Carotenoids: Properties, Effects and Diseases*, Yamaguchi M (Ed), Nova Publishers, USA, pp. 75-118
 9. **Sachindra NM** 2011. Meat decontamination. In: *Technology of muscle foods*, Mahendrakar NS and **Sachindra NM** (Eds.). Studium Press, USA, pp.29-52
 10. Rathinaraj K and **Sachindra NM** 2012. Valorization of by-products from animal products based food processing industries – Meat, poultry and eggs. In: *Valorization of Food Processing BY-products*, Chadrasekaran R. CRC Press, USA, pp. 649-684.
 11. Sowmya R, **Sachindra NM**, Hosokawa M and Miyashita K. 2012. Antioxidative properties of seaweed components. In: *Seaweed: Ecology, Nutrient Composition and Medicinal Uses*. (Eds). Vitor H Pomin Nova Publishers, USA, pp.137-162
 12. Shobharani P, Sowmya R, Sachindra NM. 2013. Anticoagulant Properties of Marine Polysaccharides. In: *Marine medicinal glycomics*. (Ed.) Vitor H Pomin, Nova Publishers, USA. Pp. 115-142
 13. Sowmya R and **Sachindra NM** 2014. Carotenoids from fishery resources. In: *Fish processing byproducts: Quality evaluation and applications*. (Eds.) Sachindra NM, Mahendrakar NS. Studium Press LLC, USA , pp. 268-293
 14. **Sachindra NM** and Mahendrakar NS 2014. Fishery byproducts: An overview. In: *Fish processing byproducts: Quality evaluation and applications*. (Eds.) Sachindra NM, Mahendrakar NS. Studium Press LLC, USA , pp.1-11

Reviews

1. Rao DN and **Sachindra NM**. 2002. Modified atmosphere packaging of meat and poultry: A review. *Food Reviews Intl* 18(4), 263-293
2. Bhaskar N and **Sachindra NM** 2006. Bacteria of public health significance associated with cultured tropical shrimp and related safety issues: A review. *J. Food Sci Technol*, 43, 228 – 238.

Research Papers

1. **Sachindra NM** and Karunasagar I 1988. Biochemical and microbiological profile of prawns treated with *Adenanthera pavonia* seed extract. Indian J Microbiol, 28: 82 – 86
2. **Sachindra NM** and Karunasagar I, 1989. Fractionation of extract from seeds of *Adenanthera pavonia* and effect of these fractions on fish spoilage bacteria. J Food Sci Technol, 26: 283 – 285
3. **Sachindra NM** and Sripathy NV 1991. Bacterial profile of salted sundried mackerel: changes during processing and storage. Indian J Microbiol, 31(2): 191 – 196
4. **Sachindra NM** and Sripathy NV 1992. Effect of preservatives and sterilization of salt on microbiological quality of salted dried mackerel. Indian J Microbiol, 32(4): 463 – 468
5. **Sachindra NM**, Lalitha S Rao and Sripathy NV 1994. Ensilaging of prawn carapace by lactic fermentation. Seafood Exp J, 25(13): 13 – 16
6. **Sachindra NM**, Sakhare PZ and Rao DN 1998. Reduction in microbial load on buffalo meat by hot water dip treatment. Meat Sci., 48: 149 - 157
7. Sakhare PZ, **Sachindra NM**, Yashoda KP and Rao DN 1999. Efficacy of intermittent decontamination treatments during processing in reducing the microbial load on broiler chicken carcass. Food Control. 10, 189 – 194
8. Yashoda KP, **Sachindra NM**, Sakhare PZ and Rao DN 2001. Microbiological quality of broiler chicken carcasses processed hygienically in a small scale poultry processing unit. J Food Quality. 24(3): 249 – 260
9. Yashoda KP, **Sachindra NM**, Sakhare PZ and Rao DN 2000. Microbiological quality of hygienically processed buffalo carcasses. Food Control. 11: 217 – 224
10. Yashoda KP, **Sachindra NM**, Narasimha Rao D, Mahendrakar NS 2001. Changes in microbial population during fermentation of silkworm pupae. Sericologia, 41(2): 253 – 261
11. Pavankumar KR, **Sachindra NM** and Rao DN 2003. Quality characteristics of vacuum packed tandoori chicken. J Food Sci Technol, 40, 313 – 315
12. **Sachindra NM**, Sakhare PZ, Mahendrakar NS and Narasimha Rao D 2004. Shelf-stable pickles from chicken and fish. J Rural Technol, 1(3), 134 - 138
13. Modi VK, Mahendrakar NS, Narasimha Rao D and **Sachindra NM** 2004. Quality of buffalo meat burger containing legume flours as binders. Meat Sci, 66 / 1, 143 – 149
14. Yashoda KP, Modi VK, Mahendrakar NS, **Sachindra NM** and Narasimha Rao D 2004. Quality of fried broiler chicken prepared by two processing methods. Food Service Res Intl, 14, 163 - 174
15. Modi VK, Mahendrakar NS, **Sachindra NM** and Narasimha Rao D 2004 Quality of nuggets prepared from fresh and smoked spent layer chicken meat. J Muscle Foods. 15, 195 – 204

16. **Sachindra NM**, Sakhare PZ, Yashoda KP and Rao DN 2005. Microbial profile of buffalo sausage during processing and storage. *Food Control*. 16, 31 – 35
17. **Sachindra NM**, Bhaskar N and Mahendrakar NS 2005. Carotenoids in different body components of Indian shrimps. *J Sci Food Agri*, 85(1), 167 - 172
18. **Sachindra NM**, Bhaskar N and Mahendrakar NS 2005. Carotenoids in crabs from marine and fresh waters of India. *LWT Food Sci Technol*, 38(3), 221-225.
19. **Sachindra NM** and Mahendrakar NS 2005. Extractability of carotenoids from shrimp waste in vegetable oils and process optimization. *Bioresource Technology*, 96(10), 1195-1200
20. Vani ND, Modi VK, Kavitha S, **Sachindra NM** and Mahendrakar NS 2006. Degradation of inosine-5'-monophosphate (IMP) in aqueous and in layering chicken muscle fiber systems: Effect of pH and temperature. *LWT Food Sci Technol*, 39, 627 – 632.
21. Modi VK, **Sachindra NM**, Sathish AD, Mahendrakar NS and Narasimha Rao D 2006. Changes in quality of chicken curry during frozen storage. *J Muscle Foods*. 17, 141 – 154.
22. Bhaskar N, **Sachindra NM**, Modi VK, Sakhare PZ and Mahendrakar NS 2006. Preparation of proteolytic activity rich ginger powder and evaluation of its tenderizing effect of spent-hen muscles. *J Muscle Foods*. 17, 174 – 184
23. **Sachindra NM**, Bhaskar N and Mahendrakar NS 2006. Recovery of carotenoids from shrimp waste in organic solvents. *Waste Management*. 26, 1092 – 1098
24. **Sachindra NM**, Bhaskar N and Mahendrakar NS 2006. Carotenoids in *Solonocera indica* and *Aristeus alcocki*, Deep-Sea Shrimp from Indian Waters. *J Aquatic Food Prod Technol*, 15, 5 – 16
25. Modi VK, **Sachindra NM**, Nagegowda P, Mahendrakar NS and Narasimha Rao D 2007. Quality changes during the storage of dehydrated chicken kebab mix. *Intl J Food Sci Technol*, 42, 827–835
26. **Sachindra NM**, Bhaskar N, Siddegowda GS, Sathisha AD and P.V. Suresh 2007. Recovery of carotenoids from ensiled shrimp waste. *Bioresource Technol*, 98, 1642-1646.
27. Bhaskar N, Suresh PV, Sakhare PZ and **Sachindra NM** 2007. Shrimp biowaste fermentation with *Pediococcus acidolactici* CFR2182: Optimization of fermentation conditions by response surface methodology and effect of optimized conditions on deprotenization/demineralization and carotenoid recovery. *Enz Microbial Biotechnol*, 40, 1427-1434
28. Bhaskar N, Sathisha, AD, **Sachindra NM**, Sakhare, PZ and Mahendrakar NS 2007. Effect of acid ensiling on the stability of visceral waste proteases of Indian major carp *Labeo rohita*. *J Aquatic Food Prod Technol*, 16, 73 – 86
29. **Sachindra NM**, Sato E, Maeda H, Hosokawa M, Niwano Y, Kohno M and Miyashita K. 2007. Radical scavenging and singlet oxygen quenching activity of marine carotenoid fucoxanthin and its metabolites. *J Agri Food Chem*, 55, 8516 – 8522

30. **Sachindra NM** and Bhaskar N. 2008. In-vitro antioxidant activity of liquor from fermented shrimp biowaste. *Bioresource Technol*, 99, 9013-9016.
31. Modi VK, Sakhare PZ, **Sachindra NM** and Mahendrakar NS. 2008. Changes in quality of minced meat from goat due to gamma irradiation. *J Muscle Foods*. 19, 430-442
32. Bhaskar N, Suresh PV, Sakhare PZ, Lalitha R Gowda and **Sachindra NM**. 2010. Yield and chemical composition of fractions obtained from fermented shrimp biowaste. *Waste Management Res*, 28, 64-70.
33. **Sachindra NM** and Mahendrakar NS 2010. Stability of carotenoids recovered from shrimp waste and their use as colorant in fish sausage. *J Food Sci Technol*, 47, 77-83.
34. **Sachindra NM**, Airanthi MKWA, Hosokawa M and Miyashita K 2010. Radical scavenging and singlet oxygen quenching activity of extracts from Indian seaweeds. *J Food Sci Technol*, 47, 94-99
35. Rathinaraj K, Sakhare PZ, **Sachindra NM** and Mahendrakar NS 2010. Proteases in chicken intestine and their stabilization by ensilaging and organic solvent treatment. *Food Bioprocess Technol*, 3:783-788
36. Amit Kumar Rai, Swapna HC, Bhaskar N, Halami P and **Sachindra NM** 2010. Effect of fermentation ensilaging on recovery of lipids from fresh water fish viscera. *Enzyme and Microbial Technol*, 46, 9-13
37. Swapna HC, Amit Kumar Rai, Bhaskar N and **Sachindra NM** 2010. Lipid classes and fatty acid profile of selected Indian fresh water fishes. *J Food Sci Technol*, 47, 394-400
38. **Sachindra NM** and Mahendrakar NS 2011. Effect of protease treatment on oil extractability of carotenoids from shrimp waste. *J Aquatic Food Prod Technol*, 20, 22-31
39. Amit Kumar Rai, Jini R, Swapna HC, **Sachindra NM**, Bhaskar N and Baskaran V 2011. Application of native lactic acid bacteria for fermentative recovery of lipids and proteins from fish processing waste: bioactivities of fermentation products. *J Aquatic Food Prod Technol*, 20, 32-44
40. Sarangi BK, Pattanaik DP, Rathinaraj K, **Sachindra NM**, Madhusuadan M and Mahendrakar NS 2011. Purification of alkaline protease from chicken intestine by aqueous two-phase system of polyethylene glycol and sodium citrate. *J Food Sci Technol*, 48, 36-44
41. Suresh PV, **Sachindra NM**, Bhaskar N 2011. Solid state fermentation production of chitin deacetylase by *Colletotrichum lindemuthianum* ATCC 56676 using different substrates. *J Food Sci Technol*. 48(3):349–356
42. Suresh PV, Anil Kumar PK and **Sachindra NM**. 2011 Thermoactive β -N-acetylhexosaminidase production by a soil isolate of *Penicillium monoverticillium* CFR 2 under solid state fermentation: parameter optimization and application for N-acetyl chitooligosaccharides preparation from chitin. *World J of Microbiol Biotechnol* 27:1435–1447

43. Meenata K, Sowmya R, Rathina Raj K, **Sachindra NM** 2011. Antioxidant activity of carotenoprotein isolate from shrimp processing discards. *J Aquatic Food Prod Technol* 20:209–221, 2011
44. Sowmya R, Rathinaraj K and **Sachindra NM**. 2011 An autolytic process for recovery of antioxidant activity rich carotenoprotein from shrimp heads. *Marine Biotechnology*, 13:918–927
45. Jini R, Swapna HC, Amit Kumar Rai, Vrinda R, Prakash HM, **Sachindra NM** and Bhaskar N. 2011. Isolation and characterization of potential lactic acid bacteria (LAB) from freshwater fish processing wastes for application in fermentative utilization of fish processing waste. *Brazilian J of Microbiol*, 42, 1516-1525
46. Zarena AS, **Sachindra NM** and Udaya Sankar K 2011. Optimization of ethanol modified supercritical carbon dioxide on the extract yield and antioxidant activity from *Garcinia mangostana* L. *Food Chemistry*, 130, 203-208.
47. Sowmya R and **Sachindra NM** 2012. Evaluation of antioxidant activity of carotenoid extract from shrimp processing byproducts by in-vitro assays and in membrane model system. *Food Chemistry*, 134, 308-314.
48. Shobha PR, Yogish D, Halami PM and **Sachindra NM**. 2013. *Potential of Cellulase From Bacillus megaterium for Hydrolysis of Sargassum*. *J Aquatic Food Product Technology* 22:520–535
49. Suresh PV, Sakhare PZ, **Sachindra NM** and Halami PM. 2012. Extracellular chitin deacetylase production in solid state fermentation by native soil isolates of *Penicillium monoveriticium* and *Fusarium oxysporum*. *J Food Sci Technol*, DOI 10.1007/s13197-012-0676-1
50. Shobharani P, Halami PM and **Sachindra NM** 2013. Potential of marine lactic acid bacteria to ferment *Sargassum* sp. for enhanced anticoagulant and antioxidant properties. *J Appl Microbiol*. 114, 96-107
51. Sowmya R, Ravikumar TM, Vivek R, Rathinaraj K and, **Sachindra NM**. 2014. Optimization of enzymatic hydrolysis of shrimp waste for recovery of antioxidant activity rich protein isolate. *J Food Sci Technol*. 51, 3199-3207
52. Shobharani P, Nanishankar VH, Halami PM and **Sachindra NM** 2014. Antioxidant and anticoagulant activity of polyphenol and polysaccharides from fermented *Sargassum* sp. *Intl J Biol Macromol*, 65, 542-548
53. Sowmya R and **Sachindra NM**. 2014. Protective effect of shrimp carotenoids against ammonia stress in common carp, *Cyprinus carpio*. *Ecotoxicol Environ Safety*, 107, 207-213
54. Sowmya R and **Sachindra NM**. 2015. Enhancement of non-specific immune responses in common carp, *Cyprinus carpio*, by dietary carotenoids obtained from shrimp exoskeleton. *Aqua Res*. 46, 1562-1572

55. Sowmya R and **Sachindra NM**. 2015. Carotenoid production by *Formosa* sp. KMW, a marine bacteria of Flavobacteriaceae family: Influence of culture conditions and nutrient composition. *Biocat Agri Biotechnol*, 4, 559-567
56. Sowmya R and **Sachindra NM**. 2016. Biochemical and molecular characterization of carotenogenic Flavobacterial isolates from marine waters. *Polish J Microbiol*, 65, 77-88
57. Leema Roseline T and **Sachindra NM** 2016. Characterization of extracellular agarase production by *Acinetobacter junii* PS12B, isolated from marine sediments. *Biocat Agri Biotechnol*, 6, 219-226.

10. Research guidance:

Guided more than 30 students of MSc (Food Technology), Msc (Biotechnology), MSc (Biochemistry), MSc (Microbiology), BTech (Biotechnology) for dissertation work and 5 students for PhD programme

11. Research Projects (Completed & Ongoing)

	Title of the project	Funding Agency	Duration
1	Microbiological quality of salted and dried fish	CSIR, NewDelhi	1991-92
2	Ensilaging of prawn carapace for use in aquaculture feeds	CSIR, NewDelhi	1992-93
3	Carotenoids from shrimp waste	CSIR, NewDelhi	1999-2001
4	Development of process for ready-to-eat chilled and frozen traditional chicken products	Ministry of Food Processing Industries, Govt. of India	2003-05
5	Recovery of proteases from fish processing wastes and their application	ICAR, NewDelhi	2004-07
6	Recovery of value added products from shrimp processing waste	Ministry of Environment and Forests, Govt. of India	2005-07
7	Conjugated polyenoic fatty acids and carotenoids from selected Indian sea weeds: recovery and application	DBT, Govt. of India	2005-08
8	Quality evaluation and application of fish industry waste lipids recovered through biotechnological approaches	DBT, Govt. of India	2008-11
9	Recovery of value added products from poultry industry, seafood processing wastes	CSIR, NewDelhi	2008-10
10	Recovery of marine carotenoids by biotechnological approaches and their application in aquaculture	DBT, India	2009-2012
11	Bioactive molecules from seaweeds: Antioxidative, antimicrobial, antihypertensive and anticancerous properties of polyphenols and polysachharides	DST, India (India-Japan Cooperative research programme)	2009-2011
12	Value addition to meat, fish and poultry	CSIR-New Delhi	2012-2014

	products/byproducts and development of molecular techniques for meat quality evaluation		
13	Development of Low cost poultry feed	CSIR-New Delhi	2013-2017
14	Biopreservatives for shelflife extension of meat and fish	CSIR-New Delhi	2013-2017
15	Preservative packaging system for meat and fish	CSIR-New Delhi	2014-2016
16	Reverse transcriptase PCR (RT-PCR) technique for detection of meat borne pathogens	DBT-New Delhi	2014-2017
17	Marine bacterial carrageenase for production of carrageenan oligosaccharides useful in food and biomedical applications	DBT-New Delhi	2014-2017
18	RE-FOOD: International Partnership for Research and Education in energy efficient resource utilization in Food value chains between Norway and India	Norwegian Research Council	2017-2019